Report of the EUB-CEAA Joint Review Panel

Cheviot Coal Project
Mountain Park Area, Alberta

EUB Applications No. 960313 and 960314

Cardinal River Coals Ltd.

August 2000

Canada | EUB Alberta Energy and Utilities Board

Report of the EUB-CEAA Joint Review Panel
Cheviot Coal Project
Cardinal River Coals Ltd.
(EUB Decision 2000-59)

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ALBERTA ENERGY AND UTILITIES BOARD

Calgary Alberta

CARDINAL RIVER COALS LTD. — Decision 2000-59

CHEVIOT COAL PROJECT — Applications No. 960313 and 960314

PANEL FINDINGS

In response to a request from the President of the Canadian Environmental Assessment Agency (CEAA) and a decision by the Alberta Energy and Utilities Board (EUB), the Joint Review Panel (Panel) reopened public hearings on March 1, 2000, into the environmental, social, and economic impacts of an application by Cardinal River Coals Ltd. (CRC) to develop the Cheviot Coal Project (Project). A summary of the Panel's conclusions and recommendations to the federal government and decisions made under its provincial mandate are set out below. The information used and the Panel's reasons for reaching the various conclusions are set out in detail in the main body of this report. In general, conclusions made in this report are supplemental to those made in the Panel's 1997 report, *Decision 97-8* (Appendix 1) and include any new information obtained since the release of that report.

Conclusions

The Panel has carefully considered the new evidence it has obtained since the close of the 1997 hearings, as well as the evidence presented in the 1997 public review. A summary of the Panel's conclusions based on its review of the above evidence is set out below.

1) With respect to the need to consider alternative means (i.e., underground mining) to the open-pit mining proposed in the Project, the Panel believes that it has received all required information. Based on this information, the Panel concludes that the surface mining design of the Cheviot Coal Project is the only economically feasible method of coal extraction. The Panel also concludes that since the underground mining alternative does not meet CRC's long-term needs for coal, the company will in the foreseeable future still require a substantial surface mine at the Cheviot site. Therefore, the Panel concludes that there is no real reduction in the eventual cumulative adverse environmental effects associated with the underground mining alternative.

2) With regard to the consideration of the submissions of the Canadian Nature Federation, the Panel believes that the appropriate reports and evidence have now been entered into the record and fully considered. The Panel notes that representatives of the Canadian Nature Federation attended the hearing, presented information, responded to questioning from the other hearing participants, and provided final argument to the Panel. This information has been considered by the Panel and is described, where relevant to the Panel's mandate and its terms of reference, in the various sections of the report.

3) The Panel concludes that the primary sources of regional (cumulative) impacts are forestry, other mining, oil and gas, and recreational developments and that the Valued Environmental Components (VECs) and the temporal and spatial boundaries selected by CRC to assess any associated adverse effects are appropriate.

4) With regard to the need to acquire and consider all the available information on forestry activity in the vicinity of the Cheviot Coal Project, the Panel believes that it has now obtained this information. This information provides the most current and comprehensive basis for understanding the cumulative impacts of the Project in association with regional forestry development.

5) With regard to the need to acquire and consider all available information on mining activity in the vicinity of the Project, the Panel believes that it has obtained all available information on both approved and reasonably foreseeable plans for mining in the region. This information provides the most current and comprehensive basis for understanding the cumulative impacts of the Project in association with other mining development.

6) The Panel concludes that the information provided with respect to oil and gas development and recreational activity was complete and sufficient to address potential cumulative effects in the region.

7) With respect to impacts on surface water quantity, the Panel concludes that there will be no significant cumulative adverse effects on surface water flow but that some minor localized negative effects may occur with respect to short-term peak flow and annual flows. These effects can be effectively mitigated through appropriate water control designs, which include the management of storm flows and the filling of end-pit lakes in such a way as to avoid negatively affecting low flows.

8) With respect to water quality, the Panel is satisfied that the impacts of Project-related sediment and nitrogen inputs to surface waters will not cause significant adverse effects either on their own or in conjunction with other regional sources. A potentially significant adverse cumulative effect of sediment input could arise if a major storm event occurred while both CRC and regional oil and gas or forestry companies were engaged simultaneously in road or rail construction. This impact could be effectively mitigated through the coordination of CRC's construction schedules with those of other regional industries.

9) The Panel concludes that while the Project will have some significant adverse effects on fish and fish habitat, CRC's plan to enhance fish habitat in water bodies created on the site and other similar strategies provide reasonable compensation for the habitat that will be disturbed by the mine.

10) The Panel believes that increased angling pressure associated with improved access could adversely affect fish populations on a regional basis, but concludes that since fisheries

managers can adapt local regulations to prevent overharvesting, the risk of this is insignificant.

11) The Panel concludes that its original findings regarding the risks of accidents and malfunctions and the impact of the environment on the Project remain relevant and any adverse effects are insignificant.

12) The Panel concludes that selenium levels in the aquatic environment, while warranting ongoing monitoring and research, do not currently represent a significant risk of adverse effects on regional water quality.

13) The Panel concludes that no significant cumulative adverse effect on the vegetative and botanical resources VEC will occur as a result of the Project. The Panel remains concerned with the efficacy of one mitigation measure, the identification and transplanting of rare and unique species, and will require that monitoring be continued and that other methods are also considered to protect this resource in order to ensure that mitigation remains effective.

14) With respect to elk, the Panel concludes that both Project-specific and cumulative adverse effects on this VEC will be of a minor nature and insignificant.

15) The Panel concludes that while cumulative impacts to various bird species through losses in habitat will occur in the region, these impacts will either not be significant or will be readily mitigable using existing techniques and planning processes, so that no significant adverse effect will occur.

16) In its initial report, the Panel concluded that some adverse effects on Harlequin duck populations would be experienced within the Cheviot mine site. The Panel also concluded, however, that the proposed mitigation measures, including ongoing monitoring, would be sufficient to mitigate these adverse effects and render them insignificant. The Panel believes that these conclusions continue to be well supported by the new data now available. The Panel does note that some cumulative effects due to increased recreation levels in the region are predicted but believes that, with appropriate mitigation, these will not be significant.

17) The Panel confirms its original conclusion that without mitigation the Cheviot Coal Project will result in significant adverse effects on grizzly bears. The Panel also concludes that without mitigation there is a significant risk of regional adverse effects, with or without the Project. Finally, the Panel concludes that the potential adverse effects of the Cheviot Coal Project on the grizzly bear can be effectively and adequately mitigated through regional planning and implementation of the February 10, 2000, "Grizzly Bear Conservation in the Yellowhead Ecosystem: A Strategic Framework" (Strategic Framework).

18) The Panel concludes that without additional measures there is a significant risk that the Cheviot Coal Project will have a significant impact on recreational uses of the area. The Panel also concludes that these effects can be effectively mitigated and suggests two specific steps to be considered. One is the creation of a new regionally based off-highway vehicle staging area. The second is the incorporation of the Cardinal River headwaters into the Whitehorse Wildland Park.

19) With regard to access management, the Panel concludes that road and other linear development densities are increasing in the region and without suitable mitigation will eventually result in adverse environmental effects. The Panel also concludes that a number of existing regulatory tools are available to address access. Within the context of clearly stated regional objectives for access management and an established process to achieve them, the Panel concludes that the above tools can effectively mitigate any future regional cumulative effects from human access. The Panel also concludes that the various planning initiatives in the region will play an important role in implementing these mitigative measures.

20) With respect to traditional use of lands by aboriginal people, the Panel concludes that despite the measures developed by CRC in collaboration with the Alexis First Nation and the Mountain Cree Camp (formerly referred to as the Smallboy Camp) to reduce the impacts on traditional uses and traditional sites, some significant adverse effects may occur. The Panel concludes, however, that these adverse effects can be justified within the context of the Project as a whole.

21) The Panel concludes that CRC has, for the purposes of this review, carried out reasonable and adequate consultation with all of the various aboriginal groups that are or may be affected by the Cheviot Coal Project, including the Treaty 8 First Nations.

22) The Panel concludes that it is unlikely that the Project will adversely affect the health, socioeconomic conditions, physical heritage, cultural heritage, or current use of land resources by the Treaty 8 First Nations or by their members for traditional purposes and that if any adverse effects do occur they will not be significant.

23) With respect to social benefits and costs, the Panel concludes that the Project, when compared to other potential uses of the area, will generate the greatest economic benefits to the region. The Panel concludes that the regional economic benefits of the Cheviot Project significantly outweigh the value of optimizing its current uses for recreation or alternative uses for wildlands protection.

24) The Panel continues to be satisfied that CRC has demonstrated that the Cheviot Coal Project is economically viable into the foreseeable future.

25) The Panel concludes that the provincial regulatory process, which includes a number of ongoing and/or renewable permits and licences for the Project, will ensure that the various monitoring programs and mitigation strategies are successfully implemented.

Recommendations

With regard to its responsibilities as set out under the *Canadian Environmental Assessment Act*, and its Terms of Reference, the Panel recommends that the Cheviot Coal Project receive regulatory approval from the Government of Canada.

The Panel has also made a number of more specific recommendations, which are summarized below:

1) The Panel recommends that the primary sources of cumulative effects proposed by CRC in its assessment of the cumulative environmental effects of the Project, i.e., other mining projects, forestry, oil and gas development, and recreation, be accepted by the federal government as appropriate for the cumulative environmental assessment (CEA).

2) The Panel recommends that the 11 VECs selected for the purpose of assessing the cumulative environmental effects of the proposed Project, i.e., surface water quantity, water quality (sediment), water quality (nitrogen), fisheries, vegetation and botanical resources, wildlife (elk), wildlife (selected bird species), wildlife (Harlequin duck), wildlife (grizzly bear), public access (recreation), and traditional use, be accepted by the federal government.

3) The Panel recommends that the temporal and spatial boundaries used in the CEA for the purpose of assessing the cumulative environmental effects of the proposed Project be accepted by the federal government.

4) The Panel recommends that Parks Canada lead the development of a program to monitor recreational activity levels in the mountain passes leading into Jasper National Park from the region.

5) The Panel recommends that the federal government accept the Panel's conclusion that the development of the underground mining alternative is not economically feasible, nor would it result in any substantive reduction in the environmental effects associated with the proposed Project.

6) The Panel recommends that the federal government accept its conclusions that cumulative adverse impacts on the aquatic VECs will be negligible to minor and that residual impacts can be either successfully mitigated or addressed through compensation.

7) The Panel recommends that the federal government accept its conclusion that, for the purpose of assessing the environmental effects of the Project, the risks of accidents and malfunctions and the impact of the environment on the Project have been adequately addressed and will not result in significant adverse effects.

8) The Panel recommends that, through the Foothills Model Forest Committee, the Department of Fisheries and Oceans (DFO), in partnership with Alberta Environment (AENV), lead the formation of a cooperative regional research and management subcommittee to help develop and implement aquatic monitoring and research and management programs in the McLeod and Cardinal River watersheds. The Panel also recommends that DFO actively participate in this and any other regional aquatic studies.

9) The Panel recommends that DFO continue to participate in the selenium working group in order to ensure that any federal requirements continue to be met.

10) The Panel concludes that no significant cumulative adverse effects on the vegetation and botanical resources VEC will occur and recommends that this conclusion be accepted by the federal government.

11) The Panel concludes that both Project-specific and cumulative impacts on elk will be insignificant and recommends that the federal government accept this conclusion.

12) The Panel recommends that the federal government accept its conclusion that the proposed mitigation measure for impacts on various bird species, including neotropical migrants, are readily mitigable using existing techniques and planning processes and that the adverse environmental effects will be insignificant.

13) The Panel recommends that the Government of Canada confirm, in a timely fashion, its position with regard to Environment Canada's request for additional research into the effects of industrial development in the boreal forest ecosystem on neotropical migrants.

14) The Panel recommends that the federal government accept the proposed mitigation measures, including ongoing monitoring, as being sufficient to reduce to insignificant any Project-related adverse effects on Harlequin ducks.

15) Given the regional importance of the Maligne River Harlequin duck population in Jasper National Park, the Panel recommends that Parks Canada ensure that its management of this population is integrated into and consistent with the broader regional planning process.

16) The Panel recommends that the federal government accept that current provincial management plans will ensure that cumulative adverse impacts from recreation in association with other industrial development, including the Cheviot Coal Project, on Harlequin ducks are insignificant. The Panel also recommends that the Government of Canada, in cooperation with the Government of Alberta, be prepared to actively support and participate in these management programs. Such participation may include providing funding to ensure their success.

17) The Panel recommends that the federal government, in its response to this report, confirm how it intends to address the issues raised by Justice Douglas R. Campbell regarding the necessary approvals from Environment Canada respecting migratory bird habitat.

18) The Panel recommends that the federal government accept the mitigation requirements set out for CRC and the undertakings of AENV as acceptable mitigation for the adverse effects of the Cheviot Coal Project on the grizzly bear VEC.

19) The Panel recommends that the federal government, in cooperation with the Government of Alberta, be prepared to actively support any associated planning and research into wildlife in the region.

20) Given the progress made to date in developing and implementing regional plans to address recreational issues, the Panel recommends that the federal government accept its conclusion that any adverse effects on the recreational VEC will be insignificant as a result of these mitigation measures.

21) The Panel recommends that the federal government allocate adequate resources for effective participation by Parks Canada in regional access planning initiatives.

22) The Panel recommends that the federal government accept the measures developed collaboratively by CRC, the Alexis First Nation (AFN), and the Mountain Cree Camp to reduce the impacts on traditional sites and use of the lands and resources in the Project study area as adequate to mitigate the majority of the adverse effects.

23) The Panel recommends that the federal government accept that any remaining significant adverse effects on traditional sites and uses are justified in terms of the Project as a whole.

24) The Panel recommends that, for the purposes of this review, the federal government accept that CRC has carried out reasonable and adequate consultation with regional aboriginal groups.

25) The Panel recommends that both levels of government assess and clarify, in a timely fashion, their perceived respective obligations in relation to consultation with First Nations in the region.

26) The Panel concludes that the Cheviot Coal Project as proposed will result in a net economic benefit to the region and recommends that the federal government accept this conclusion.

27) The Panel recommends that the federal government accept its conclusion that the Cheviot Coal Project remains economically viable into the foreseeable future.

28) The Panel recommends that the federal government determine, in a timely fashion, how it can best contribute to ensuring that opportunities exist for communities, such as Hinton, that are proximal to federal lands and particularly to national parks to develop a sustainable, balanced, and diverse economic base.

29) The Panel recommends that Parks Canada, Environment Canada, and DFO receive and assess on an annual basis the results from the various monitoring programs being carried out by CRC. The Panel also recommends that these agencies meet with the EUB and AENV on a regular basis to discuss any concerns that might arise from that review.

Decisions

Having regard for its responsibilities for matters that fall under the mandate of the EUB, the Panel has carefully considered all of the evidence and views presented at the 1997 and 2000 public hearings. The Panel has determined that it did not receive any new evidence during the reopening of the public hearings that would cause it to vary its original decision. The Panel therefore has determined that Applications 960313 and 960314 continue to meet all provincial regulatory requirements and that the Cheviot Coal Project remains in the public interest. Accordingly the Panel is prepared to uphold the approvals already issued. These approvals (Appendix 3) are conditional on commitments made by the applicant at both the 1997 and the most recent public review, as well as the conditions stipulated by the Panel in its 1997 decision (Appendix 1).

Conditions

In addition to those original conditions, the Panel will apply the following conditions to the current approvals:

1) CRC shall monitor selenium levels in the water and biota of new end-pit lakes, assess potential adverse effects on biota, and summarize the results in an annual report to the EUB. CRC will continue to participate in the Selenium Working Group to investigate ways to manage selenium in surface waters. As part of the annual report, CRC will describe any changes in the mine project design or operations the company proposes to avoid or mitigate potential adverse effects of selenium.

2) CRC shall schedule its rail and road construction after consulting with regional forestry and oil and gas companies to avoid the potential adverse cumulative effects of sedimentation that could arise should a storm event coincide with concurrent road and rail construction.

3) CRC shall continue to conduct recognizance-level surveys for rare plant species on the mine property and intensive surveys on parts of the site slated for development. CRC will also monitor the success of rare species transplants. The results of the rare plant surveys and transplant monitoring will be reported to AENV.

4) CRC shall, in consultation with the EUB, continue to refine the details of its mine plan to minimize the impact of the mine on grizzly bears. Specifically, CRC will review and address the effects of upcoming management plans for the Whitehorse Wildland Park, threshold values for landscape indicators, the development of the Strategic Framework,

regional access management plans, and the response of the provincial government to the Panel's recommendation for further protection of the Cardinal headwaters.

5) CRC will report to the EUB on an annual basis on its efforts to identify and protect precontact and historic archaeological sites and to reduce adverse impacts on the traditional use of lands and resources.

6) CRC will initiate discussions with AENV to identify and develop an alternative to the Mountain Park off-highway vehicle staging area site before it is closed by mine development.

7) CRC will ensure that its development remains consistent with landscape indicator or other thresholds developed through ongoing regional environmental management initiatives.

DATED at Calgary, Alberta, on September 12, 2000.

ALBERTA ENERGY AND UTILITIES BOARD
CANADIAN ENVIRONMENTAL ASSESSMENT AGENCY

B. F. Bietz
Panel Chair

G. J. Miller
Panel Member

T. Beck
Panel Member

1 INTRODUCTION

On June 17, 1997, the Alberta Energy and Utilities Board (EUB)/Canadian Environmental Assessment Agency (CEAA) Joint Review Panel (the Panel) released its report (*Decision 97-8*) regarding the construction and operation of the proposed Cardinal River Coals Ltd. (CRC) Cheviot coal mine and processing plant (the Project) south of Hinton, Alberta. The report also addressed TransAlta Utilities Corporation's proposed new transmission line/substation to supply electric power to the Project. *Decision 97-8*, a copy of which is attached as Appendix 1, constituted the findings of the Panel on matters that fall under the jurisdiction of the EUB and its recommendations to the Government of Canada on matters that fall under federal jurisdiction.

Under its EUB mandate, the Panel, having considered the evidence and views presented at the hearing, was satisfied that, subject to a number of conditions, the Cheviot Coal Project met all regulatory requirements and was in the public interest. Consequently, a number of permits, licences, and approvals were issued by the EUB and AENV under applicable provincial legislation.

With regard to its federal mandate, the Panel concluded that sufficient information had been provided for it to be able to determine that the majority of the environmental effects, including socioeconomic effects, were either positive or, where adverse, were not significant. Where the environmental effects were considered to be adverse and significant, they were generally considered to be justified in the context of the Project as a whole or, in the case of nonmitigable habitat loss, the proposed compensation was found acceptable. Accordingly, the Panel recommended that the Government of Canada approve the Cheviot Coal Project and accept the mitigation measures proposed by CRC and subsequently required by the EUB and AENV (previously Alberta Environmental Protection) as adequate.

In October 1997, the Minister of Fisheries and Oceans issued the *Federal Government Response to the Report*, accepting those recommendations and indicating that authorizations for the Project would be issued under the *Fisheries Act*. On August 17 and September 29, 1998, the Department of Fisheries and Oceans (DFO) issued its authorizations (the DFO Authorizations) pursuant to Section 35(2) of the *Fisheries Act*.

On October 31, 1997, a coalition of the Alberta Wilderness Association, the Canadian Nature Federation, the Canadian Parks and Wilderness Society, the Jasper Environmental Association, and the Pembina Institute for Appropriate Development (the AWA Coalition) filed the first of a series of applications for judicial review of *Decision 97-8* and the subsequent DFO Authorizations. On April 8, 1999, Justice Campbell of the Federal Court of Canada–Trial Division determined that the environmental assessment conducted by the Panel was not in compliance with the requirements of the *Canadian Environmental Assessment (CEA Act)* and the Panel's terms of reference and that the DFO Authorization of August 17, 1998, had been issued without jurisdiction and must therefore be quashed. CEAA subsequently requested the Panel to reconvene to address the issues raised by Justice Campbell in his decision in order to comply with the *CEA Act* and with the Panel's terms of reference. At the same time, the EUB determined that since a reopening of the hearing could potentially generate significant new evidence, a

review of the Panel's decision, made under Section 42 of the *Energy Resources Conservation Act (ERC Act)*, was appropriate.

A prehearing meeting was held in Hinton, Alberta, on September 9, 1999, to discuss the issues to be addressed at the reconvened hearing. A *Memorandum of Decision* in respect of the prehearing meeting was issued on September 23, 1999 (Appendix 2). The hearing itself was reconvened in Hinton, Alberta, from March 1 to 10, 2000, and from April 25 to 27, 2000. This report describes the evidence presented to the Panel at the reconvened hearing, the conclusions subsequently reached by the Panel, and the Panel's recommendations to the federal government. Thisreport, together with *Decision 97-8*, constitutes the Report of the EUB–CEAA Joint Review Panel regarding the Cheviot Coal Project.

1.1 Project Description

The Cheviot Coal Project is a proposal by CRC for the construction, operation, and decommissioning of a coal processing plant; for the development, operation, and reclamation of an open pit coal mine; for the restoration of the Mountain Park subdivision rail line; for the upgrading of the existing access road (the Grave Flats Road) into the Cheviot mine area; and for the installation of a new transmission line and substation to supply electric power to the Cheviot mine.

The Project (Figure 1) is located in the Rocky Mountains of west-central Alberta approximately 320 kilometres (km) west of the City of Edmonton and 70 km south of the Town of Hinton. The proposed open pit (surface) mine would be centred around the former community of Mountain Park, approximately 20 km southeast of CRC's existing Luscar mine and 12 km south of the Hamlet of Cadomin.

The Cheviot mine permit area is approximately 23 km long and 3.5 km wide and located within an east-west trending valley. Mining activity has been carried out within the proposed mine permit boundary from the early 1900s until the 1950s. A more detailed description of the Project is available in Section 1.1 of *Decision 97-8* (Appendix 1).

1.2 Current and Future Authorizations

The approvals and authorizations for the Project issued by the Province of Alberta and the Government of Canada are listed in Table 1 below and are attached as Appendix 3.

Table 1. Approvals and authorizations

Approval/authorization	Issued by	Issued under	Date issued
Mine Site Permit No. C 97-14	EUB	S. 10 of the *Coal Conservation Act*	Aug. 19, 1997
Coal Processing Plant Approval No. C 97-15	EUB	S. 23 of the *Coal Conservation Act*	Sept. 5, 1997
Cheviot Mine Access Corridor Authorization *	DFO	S. 35(2) of the *Fisheries Act*	Aug. 17, 1998
Permit No. 98-44-NES (Road)	AENV	S. 11 of the *Water Resources Act*	Aug. 17, 1998
Permit No. 98-45-NES (Rail)	AENV	S. 11 of the *Water Resources Act*	Aug. 17, 1998
Authorization No. AB94-052-2 (Facilities)	DFO	S. 35(2) of the *Fisheries Act*	Sept. 29, 1998
Approval No. 46972-00-00 (Mine & Plant)	AENV	S. 65 of *Alberta Environmental Protection and Enhancement Act*	Sept. 29, 1998
Interim Licence No. 22085 (Pre-Development)	AENV	S. 24 of the *Water Resources Act*	Sept. 29, 1998

* Justice Campbell subsequently quashed this authorization in his April 1999 ruling.

Over the life of the Project, CRC will require further approvals, including

- licences from the EUB with respect to the individual pits and external waste rock dumps;
- amendments to the *Alberta Environmental Protection and Enhancement Act* approval from AENV with respect to further development within the Project area; and
- authorizations from DFO with respect to any future harmful alteration, disruption, or destruction of fish habitat resulting from pit development and mining.

2 BASIS FOR REVIEW

2.1 Directions from the Federal Court

As noted earlier, in his *Reasons for Order* with respect to Application T-1790-98, Justice Campbell found that the environmental assessment for the Project was not conducted in compliance with the requirements of the *CEA Act* and the Panel's terms of reference and declared the DFO Authorization issued on August 17, 1998, quashed.

Justice Campbell indicated that, in his opinion, the most appropriate approach would be for the Minister of the Environment to direct the Panel to "do what is necessary to make adjustments to the Joint Panel Decision so that the environmental assessment can be found in compliance" with the *CEA Act*. In this regard, Justice Campbell expressed the opinion that the following directions to the Panel must be met:

1) Obtain all available information about likely forestry in the vicinity of the Project, consider this information with respect to cumulative environmental effects, and, accordingly reach conclusions and make recommendations about this factor, and substantiate these conclusions and recommendations in the Joint Review Panel Report;

2) Obtain all available information about likely mining in the vicinity of the Project, consider this information with respect to cumulative environmental effects, and, accordingly reach conclusions and make recommendations about this factor, and substantiate these conclusions and recommendations in the Joint Review Panel Report;

3) With respect to alternative means, do a comparative analysis between open pit mining and underground mining at the Project site to determine the comparative technical and economic feasibility and comparative environmental effects of each, consider this information, reach conclusions and make recommendations about this factor, and substantiate these conclusions and recommendations in the Joint Review Panel Report;

4) Consider the documents "The Canadian Nature Federation's Response to the Environmental Impact Assessment of the Proposed Cheviot Mine Project" and "The Canadian Nature Federation's Response to Norwest's Overview of Rock Waste Disposal Cheviot Mine Plan".

2.2 Panel's Views

The Panel notes that, by correspondence to the EUB dated June 22, 1999, the President of the CEAA requested that the Panel reconvene to ensure that the environmental assessment for the Cheviot Coal Project could be found to be in compliance with the *CEA Act* and the Panel's terms of reference. The request specifically stated the Panel should address the four matters set out in Justice Campbell's decision. As noted earlier, the EUB, under Section 42 of the *ERC Act*, also decided, given the reopening of the public hearing and the possibility that new evidence not previously considered during the previous review may be raised, to review the earlier decision made in respect of the applications. During a prehearing meeting held in Hinton, Alberta, on September 9, 1999, the Panel explored the basis upon which the proposed review would be conducted. The prehearing *Memorandum of Decision* (Appendix 2) stated that the Panel "does

not believe that it is in any way fettered in its ability to address other issues that it finds to be relevant and germane to its review during the course of the public hearing."

Having regard for the directions of the Federal Court and the regulatory obligations of the EUB, the Panel continues to hold that view. The Panel believes that the appropriate approach to the review is to first consider the new information collected, including any relevant information beyond the specific direction of the Federal Court. The next step is to test the findings and conclusions reached in the earlier review against the new information. In addition to the four items directed to the Panel by the Federal Court, the Panel notes that a large amount of additional evidence was brought forward at the hearing on a number of issues. Additionally, the passage of time since the release of the earlier decision has resulted in additional and more current information being available. For example, in some cases new information directly related to the implementation of recommendations made as a result of the earlier review was now available. The Panel believes that it must consider all relevant information available when considering the impacts anticipated from the proposed Cheviot mine.

The final step of the process is for the Panel, having regard for the information available, to draw any new conclusions and, as appropriate, confirm or revise its recommendations to the federal government. Additionally, the Panel must determine whether there is a need to vary or rescind the EUB approvals currently issued for the Cheviot mine.

3 REVIEW PROCESS

3.1 Terms of Reference/Agreement

The original terms of reference for the conduct of the Joint Review Panel were detailed in an Agreement dated October 24, 1996, between the EUB and the Government of Canada. The overall objective of that Agreement was to ensure that the Project was evaluated according to the spirit and legislated requirements of the EUB and the Government of Canada while avoiding unnecessary duplication, delays, and confusion that could arise from two separate review processes. The Agreement was based on the August 6, 1993, framework for conducting joint panel reviews included within the Canada-Alberta Agreement for Environmental Assessment Cooperation.

In the June 22, 1999, letter from CEAA requesting that the Joint Review Panel be reconvened, the President of CEAA indicated that the original October 24, 1996, Agreement between CEAA and the EUB should continue to be used for the completion of the Cheviot review. Since the terms of reference for the Joint Review Panel are included in that Agreement, they were also carried over to the second public hearing proceeding.

In a letter to the AWA Coalition dated October 11, 1999, the Panel stated that it did not believe there was a need to issue new terms of reference for the Cheviot review. The letter noted that neither Justice Campbell's directions nor the CEAA had suggested that new or modified terms of reference were necessary in order to reconvene the hearing or continue the Cheviot review process.

3.2 Prehearing Meeting

A prehearing meeting was held to provide the applicant and other interested parties with an opportunity to comment on the various issues to be addressed at the reconvened hearing. Also discussed was the availability of information needed by CRC to prepare any further submissions, the likely date of any further submissions by CRC, and the schedule and process for the review of those submissions. The prehearing meeting was also used to discuss the role of interveners at the hearing, the establishment of a public registry, and other relevant procedural matters associated with reconvening the hearing.

In the prehearing *Memorandum of Decision*, the Panel considered the scope of the hearing and decided that it must take its primary direction from the four items deemed to be deficient in Justice Campbell's decision. However, the Panel also confirmed that it was equally prepared to address other issues that it found to be relevant and germane to its review. For example, the Panel acknowledged that oil and gas development, recreation, and other sources of disturbance would also need to be considered, along with environmental resources not previously considered, to the extent that they also interact with the Project and were relevant to the Panel's mandate.

Several parties suggested at the prehearing meeting that the Panel retain independent consultants to advise it in the areas of mining, forestry, and cumulative effects. The Panel accepted that the

addition of such expertise might play a useful role in obtaining adequate technical information to carry out the additional review prescribed by Justice Campbell. As a result, the Panel obtained experts in these areas to review information supplied by CRC and others and to advise the Panel as to the acceptability of the information (see Section 3.3).

The Panel also indicated its intent to review the need for additional work in areas beyond the scope set out by Justice Campbell and noted that it would advise participants in the hearing as those decisions were made. The Panel anticipated that the extent to which other issues would need to be addressed would depend in part on the amount and type of information provided by the applicant, government, and its own experts.

With regard to the timing of the hearing, it was determined that CRC would submit its information regarding alternatives to mining, additional baseline information, and its response to the Canadian Nature Federation's (CNF) 1997 reports by October 15, 1999. CRC would then submit its amended CEA by November 15, 1999. The Panel allowed 30 working days (approximately six weeks) from the receipt of the applicant's final submissions for government participants to respond to the information provided by CRC. Written submissions from other participants were due 20 working days (approximately four weeks) later, in order to allow time to respond to the additional information.

Some parties suggested that the approvals already issued by the EUB for CRC's proposed mine and coal preparation plants (Table 1) should be rescinded or revoked. However, the Panel noted in the prehearing *Memorandum of Decision* that the EUB's legislation did not require this action while a review was undertaken. It also noted that CRC had committed to not initiate interim construction activities while continuing to meet the information requirements of the approvals. Therefore, the Panel did not believe that it was necessary to rescind the provincial approvals or that the retention of those approvals in any way fettered its discretion to vary or rescind its previous decisions subsequent to its consideration of any relevant new information.

The Panel established a public registry of materials related to the Project review to facilitate public access to the information. The registry was established in both Hinton and Edmonton until commencement of the hearing, at which time the Edmonton registry was moved to Hinton. During the hearing, daily transcripts were accessible to the public in Hinton, Edmonton, and Calgary.

3.3 Role of the Panel's Consultants

The Panel advised all participants by letter dated November 30, 1999, that it had retained three experts to address certain parts of the technical review. Each of these experts assessed the information submitted by CRC, provided their reports to the Panel and all participants, and appeared at the hearing to present information and answer questions related to their conclusions.

Dr. Everett Peterson, of Western Ecological Services, was retained to review CRC's reports on forestry activities in the vicinity of the Project and to evaluate the adequacy of that information. Dr. Peterson reviewed the information provided by CRC in November 1999 and issued a report

on January 10, 2000. In that report, he noted that there was ambiguity and lack of clarity as to the amount and type of information CRC had obtained from Weldwood Canada.
Dr. Peterson issued a second report on February 29, 2000, following discussions with Weldwood, to clarify certain aspects of his earlier report. In his second report, Dr. Peterson concluded that CRC had received and had available, in cooperation with Weldwood, the most recently available forestry information, including both the currently approved forest management plan and the 1999 draft forest management plan.

Dr. William Ross, of the University of Calgary, was retained to review the completeness of the CRC's November CEA. Dr. Ross's initial report was made available January 10, 2000. Dr. Ross stated that he had based his assessment of CRC's work on four requirements for CEA. The criteria used as the basis for his evaluation and the results he provided are more fully addressed under Views of the Panel's Consultant in Sections 5 through 7 of this report. In response to material presented during the hearing, Dr. Ross submitted a second report on April 11, 2000.

Mr. H. G. Stephenson, of Norwest Mine Services Ltd. (Norwest), was retained to review the comparative viability of both underground mining and surface coal mining. Two reports were submitted to the hearing. The first (November 11, 1999) reviewed a comparison of underground and surface mining prepared by CRC and its consultants. Mr. Stephenson characterized CRC's analysis as inconclusive. He was subsequently asked by the Panel to prepare a second, independent assessment of whether underground mining could be technically and economically feasible and how it would compare with surface mining. He submitted that report on February 22, 2000.

In his second report, Mr. Stephenson concluded that the only underground mining system applicable to the conditions found at Cheviot would be the room and pillar method using continuous miners. He also concluded that none of the underground mining cases using this approach that he examined were economically feasible, even at the best coal price that he believed could reasonably be envisioned.

Each of the Panel's consultants made a presentation and was available for questioning during the course of the hearing.

3.4 Documents Submitted by the Canadian Nature Federation

CNF provided two reports in 1997 that were intended to be part of the original proceeding. The first dealt with its response to the environmental impact assessment (EIA) report of the Cheviot Coal Project. The second report was submitted following the conclusion of the public hearing process. It dealt more specifically with CNF's response to Norwest's 1997 report, *Overview of Rock Waste Disposal Cheviot Mine Plan.* CNF did not directly participate in the original hearing, although there was some indication before the Panel that CNF would be represented. Following the publication of the initial Joint Panel's review of the proposed Cheviot Coal Project, CNF participated in the federal court proceeding that resulted in the ruling of Justice Campbell. That ruling, as noted in Section 2 of this report, stated that the Panel must consider those documents in a reconvened proceeding.

For the March 2000 Panel review, CNF also submitted a February 7, 2000, document addressing certain aspects of the 1999 CEA provided by CRC. In addition, the earlier documents prepared in 1997 were entered into the proceeding. CNF also participated directly in the reconvened hearing, giving direct evidence and addressing questions from the other hearing participants.

3.5 Directions to the Participants

The Panel provided written directions to the applicant and the federal and provincial government departments and agencies throughout the process. Some of the more pertinent letters are described in this section.

In response to a request by CRC, the Panel, in a letter dated August 4, 1999, explained the type and scope of information required by the applicant to address the deficiencies outlined by Justice Campbell. In a subsequent letter dated September 15, 1999, the Panel requested that CRC provide a written explanation of the methodology and rationale used for selecting the VECs. The Panel indicated that it would forward the information to the appropriate federal and provincial government departments and agencies for their review and comments. CRC responded to this request on September 17, 1999.

On September 15, 1999, the Panel also outlined CRC's list of proposed VECs in a letter to the governments of Alberta and Canada. The Panel requested that the government departments review CRC's submissions and provide comments as to their views on the adequacy of the list.

On November 9, 1999, the Panel received a written request from the CEAA requesting that it consider a proposal from the Canadian Parks and Wilderness Society to consider mediation as a way of resolving issues associated with the Cheviot Coal Project. In response to that request, the Panel asked the applicant its views regarding a mediation process. CRC stated that it was not prepared to participate in a mediation exercise and outlined its reasons. In response to the parties, the Panel indicated its willingness to recognize the results of such a process should the parties decide to participate.

In a letter dated November 23, 1999, the Panel asked CRC to provide updated information on the long-term economic viability of the Project, including the potential for future long-term coal markets. The Panel took the position that it had already addressed this issue adequately in its previous decision but believed it should determine if there had been any substantive changes in the Project and so asked CRC to speak to the issue.

On December 6, 1999, the Panel sent a copy of the report on underground mining alternatives prepared by Norwest to CRC. The letter asked CRC to comment on the report, particularly as Norwest had noted that more underground mineable coal was available than CRC had determined. CRC replied by letter dated February 1, 2000.

3.6 Public Hearing

The hearing of the Cheviot Coal Project began on March 1, 2000, and continued until March 10, 2000. After an adjournment period, the hearing reconvened for the period April 25 to 27, 2000.

Table 2 lists the hearing participants and those who appeared on their behalf.

TABLE 2 THOSE WHO APPEARED AT THE HEARING

Principals and Representatives (Abbreviations Used in Decision)	Witnesses
Cardinal River Coals Ltd. (CRC) D. R. Thomas	F. Munn L. LaFleur B. Logan J. Strid B. Ramsay J. Gendron B. MacCallum J. Kansas S. Herrero W. Strong A. Wolanski B. Mackay J. Allan W. Veldman K. Hale D. Hackbarth P. Chapman M. Dutton
Hinton and District Chamber of Commerce C. Mork	B. Gouthro M. Dery R. Carramusa C. Mork
United Mine Workers of America, Local 1656 (UMWA) R. Campbell	R. Campbell
Town of Hinton R. Risvold	R. Risvold
Alberta Environment (AENV) and Alberta Health and Wellness	

R. Bodnarek
H. L. Veale

W. Macdonald
D. Cox
K. Smith
G. Stenhouse
G. Sterling
L. Notan
A. MacKenzie

Cadomin Environmental Protection Association (CEPA)
R. M. Kruhlak

C. Way

Government of Canada
P. Hodgkinson

G. Linsey
R. Tupper
J. G. LeFebvre
L. LaPalme
M. Fairbairn
W. Fenton
P. Gregoire
G. Holroyd
R. Hooper
J. Weaver
W. Bradford
S. Cardiff
D. Johnson
B. Dobson
H. Purves
D. Hodgins
W. Fenton
D. Kirkland

Weldwood of Canada Ltd. (Weldwood)
J. Bouthillier
T. Whitford

R. Udell
R. Stauffer
H. Lougheed

Alberta Wilderness Association, Jasper Environmental Society, Pembina Institute for Responsible Development, Canadian Parks and Wilderness Society, and Ben Gadd (AWA Coalition)
J. Klimek
D. Pachal

D. Pachal
S. Gunsch
B. Gadd
J. Seaton
R. Notnes
P. Kittredge
D. Howery

	H. Stellmach
Mountain Park Environmental Protection and Heritage Association	
E. A. Godby	E. A. Godby
M. Bracko	M. Bracko

Alpine Club of Canada/Alberta Native Plant Council (ACC/ANPC)	
A. Dinwoodie	A. Dinwoodie
I. Strang, MLA for West Yellowhead	
C. Breitkreuz, MP for Yellowhead	
G. Griffiths	G. Griffiths
Mountain Cree Camp and Mountain Cree Camp Syllabics Institute	
M. Nadeau	M. Nadeau
B. Parry	B. Parry
	G. Fedirchuk
	R. Nielson
	J. Budinski
Trout Unlimited Canada (TUC)	
K. Brewin	K. Brewin
T. Antoniuk	
Alberta Fish and Game Association (AFGA)	
Q. Bochar	
Alexis First Nation (AFN)	
S. McDonough	Chief Francis Alexis
E. Johnson	P. Potts
Canadian Nature Federation (CNF)	
K. McNamee	
S. Hazell	
Environmental Resource Centre	
K. Charest	
J. D. Clark	
J. Mitchell	
J. O'Chiese	
Western Canada Wilderness Committee (WCWC)	
L. Phillips	L. Phillips
G. Jones	G. Jones

Treaty 8 First Nations of Alberta (Treaty 8 FN)
- J. Rath
- J. Handel

Panel Consultants
- W. Ross
- E. Peterson
- H. G. Stephenson

Panel Secretariat
- W.Y. Kennedy
- L. J. MacLachlan
- D. I. R. Henderson
- N. Seguin
- R. Creasey
- R. Powell
- J. P. Thompson
- L. Roberts
- A. Stoddart
- C. Brown
- D. Morris
- V. Nixon

4 ALTERNATIVE MEANS (UNDERGROUND MINING)

The AWA Coalition suggested that during the 1997 proceedings CRC had not adequately addressed undergound mining as an alternative to the development of the proposed surface mine. It argued this was a failure of the applicant to meet the requirements of the *CEA Act*, which specifically requires an assessment of alternatives to a project. Its position was that underground mining, if feasible, would potentially result in significantly less environmental disturbance and therefore should be evaluated thoroughly.

The issue was addressed briefly at the previous hearing by CRC, with a limited amount of evidence provided to support the company's view that the complex geology of the region, combined with the nature of the coal seams, made underground mining technically difficult and as a result uneconomic. Representatives of the United Mine Workers of America (UMWA) presented evidence that its members were not trained in underground mining techniques and that the work environment and safety issues associated with underground mining were unacceptable. As a result, there would be significant regional social and economic impacts associated with the shift to underground mining.

4.1 Views of the Applicant

In response to the request from the Panel, CRC indicated that it had further reviewed the potential of applying underground mining methods to the proposed Cheviot Project as an alternative means to the original surface mine concept. CRC stated that it had compared the technical, economic, and environmental issues associated with both underground and surface mining and had provided an estimate of coal reserves available through underground mining and a description of underground mining methods that would be used. This included an assessment of the likely productive capability and life expectancy of an underground mine, a capital and operating cost comparison between underground and open-pit mining, and a comparison of environmental effects, including cumulative effects. CRC stated that it had also commissioned an independent third party to evaluate the technical and economic feasibility of the two mining methods.

CRC indicated that all of its studies, including that by its consultant, demonstrated that underground mining in this area was neither technically nor economically feasible. The reports concluded that due to the nature of the deposit, room and pillar mining was the only proven underground mining technique possible. CRC noted that access to and recovery of the coal would be compromised by the limitations of both available underground mining equipment and the geological nature of the reserve. The potential coal reserves available for underground mining at the Cheviot site were predicted to be limited to approximately 6 million clean metric tonnes (CMT). CRC stated that the risks associated with the highly folded and faulted geology of the area and the lack of a workforce trained for underground mining provided additional support for its conclusion that underground mining was neither technically nor economically feasible.

CRC indicated that the cost of underground mining would be approximately $27.50 CMT, not including the cost of power or roads to the site, exploration costs, or preparation plant charges.

CRC indicated that the operating costs of the underground mining alternative would be too high for the Project to be economically feasible.

In light of its findings, CRC indicated to the Panel prior to the hearing that it did not believe an evaluation of the environmental effects of the underground mine was required by the *CEA Act.* The company noted that Section 16(2)(b) of the *CEA Act* only requires that the assessment consider the environmental effects of alternative means that are "technically and economically feasible." The Panel Secretariat requested that the environmental comparison be completed. This suggestion was based on Justice Campbell's direction, which required that the Panel

> With respect to alternative means, do a comparative analysis between open pit mining and underground mining at the Project site to determine the comparative technical and economic feasibility **and comparative environmental effects** [emphasis added] of each, consider this information, reach conclusions and make recommendations about this factor, and substantiate these conclusions and recommendations in the Joint Review Panel Report.

In response, CRC did provide an environmental comparison between surface and underground mining alternatives. In preparing the comparison, the company elected to describe two comparable production scenarios in order to establish a common basis of comparison: one for the most likely potential underground mine and one for a reduced hypothetical surface mine with a comparable production capacity to the underground scenario. As a result, because there were significantly fewer coal reserves available through underground mining, the surface mine considered in the analysis was considerably smaller than the full surface development scenario applied for by CRC. In CRC's view, this approach to the comparison allowed the environmental impacts of the two cases to be properly addressed on a relative basis.

CRC concluded that the underground mining alternative would have a greater relative effect on more VECs, create more adverse cumulative effects, and consequently be more detrimental to the environment than the equivalent proposed surface mine at the Cheviot site. However, CRC also noted that most of the effects associated with the underground alternative were anticipated to be mitigable, local, and negligible to minor in nature. Because under the scenarios considered coal would be processed at the existing Luscar plant rather than at a new plant, the exceptions to this were potentially elevated noise and dust levels associated with transporting the coal from the site. This could result in a major local effect, particularly in the Hamlet of Cadomin.

In response to questions from the Panel, CRC said that it expected that an underground mine would only meet its expected customers' requirements for coal for a two- to three-year period. Once those resources were extracted, CRC indicated that it would likely need to reapply for a surface mine development at the same location if it were to continue to meet its export contracts.

4.2 Views of the Interveners

Natural Resources Canada (NRCan) stated that it supported CRC's opinion that the underground mining alternative was neither technically nor economically feasible. It concluded that the mining assumptions made and the criteria used by CRC were realistic and sufficient to determine that the underground option was not viable to efficiently mine the coal at the Cheviot site. NRCan took

the position that CRC's hypothetical environmental comparison allowed for a valid comparison between the two alternative means and their potential effects.

The Hinton Chamber of Commerce submitted that the open-pit mining method was a more positive alternative for the people of Hinton. The Chamber felt that an open-pit mine would provide approximately 300 more direct jobs than an underground mine and was more suited to the current skills of the workforce in Hinton. The Chamber also felt that the underground alternative represented a higher risk in terms of human safety.

At the hearings, the UMWA indicated that underground mining involved a number of health and safety risks for miners. It indicated that this form of mining was used in years past and was not the type of work environment that its members wanted to go back to. The UMWA agreed with CRC's opinion that the underground mining alternative was neither technically nor economically feasible.

Based on many years of personal experience in the coal mining industry, Mr. Mitchell, a local resident, indicated that the underground mining alternative was neither technically nor economically feasible. He noted that the safety risks involved in underground operations, particularly considering the structural instability of the geology in the area, were very high and felt strongly that open-pit mining was the only feasible mining alternative at the Cheviot site.

The Cadomin Environmental Protection Association (CEPA) expressed concern with CRC's underground mining scenario, which included transporting coal by truck from the Cheviot site to the existing Luscar site. In its submission to the Panel, CEPA requested that the Panel consider the impacts on the community of Cadomin when assessing the viability of other mining alternatives.

A number of interveners did express concern over CRC's choices in creating the scenarios by which the hypothetical environmental effects comparison of underground and open-pit mining was carried out. Environment Canada felt that CRC's comparison did not allow for careful consideration of the comparative environmental effects. In its submission to the Panel, Environment Canada recommended that consideration of an environmental effects comparison based upon the actual proposed surface mine might have more effectively contributed to the implementation of improved mine development possibilities and better environmental management. It also recommended that any conclusions be clearly substantiated in order to allow the Panel to completely review and assess the associated impacts, reach conclusions, and make recommendations.

The AWA Coalition, in its submission, also expressed concern about CRC's hypothetical comparison between open pit and underground mining. It felt that this type of comparison did not meet the court's direction and that in looking at the environmental impacts of the two mining alternatives, the hypothetical reduced volume open pit model should not have been used. While the AWA Coalition conceded at the hearing that it had no expertise to address the technical aspect of the underground mining alternative, it did agree under cross-examination that underground mining did not appear to be economically feasible.

At the hearing, the AWA Coalition stated it strongly believed that CRC should also be required to assess other surface alternatives to the proposed mine at alternative locations. The AWA Coalition noted that Luscar, one of the two partners in the Cheviot Project, had recently acquired an interest in the Line Creek coal mine development in British Columbia. This mine, it argued, could be expanded sufficiently to provide the company with equivalent volumes and quality of coal. The AWA Coalition felt that this was another alternative to the Cheviot Project that should be addressed in CRC's assessment of relative environmental effects. It also suggested that a comparative analysis of sequentially placing the excavated rock into the mine pits, rather than filling stream valleys, should have been examined as an alternative approach to the proposed mining scenario.

The Alpine Club of Canada and the Alberta Native Plant Council (ACC/ANPC) also found CRC's comparison to be inappropriate. They accepted that the underground option may not have been technically or economically feasible, but felt that a more appropriate comparison of relative environmental effects would have been between the mine as currently proposed and the same mine with the addition of underground development.

The Western Canada Wilderness Committee (WCWC) also found CRC's comparison to be deficient. The WCWC felt that there was a skewed interpretation of environmental effects because the analysis used a hypothetical 6 million CMT open-pit mine, rather than the proposed 60 million CMT open-pit mine. Also, the WCWC believed that the alternative of not proceeding with the development of the mine should have been considered in terms of relative environmental effects.

4.3 Views of the Panel's Consultant

As noted earlier, Mr. Stephenson, of Norwest, was retained by the Panel to provide an independent review and evaluation of the technical and economic feasibility of underground mining at the proposed Cheviot site. He was also asked to compare an underground mining scenario with the surface mine proposed by CRC.

In his report, Mr. Stephenson agreed with CRC's conclusion that room and pillar mining was the only underground mining method that had potential to be technically and economically feasible. With the exception of a few parameters used in estimating reserves, Mr. Stephenson was also in agreement with the general methodology used by CRC's consultants for identifying reserve areas. He concluded that a reserve of up to 7.6 million CMT could be recoverable on the Cheviot site based on the shallow exploration work that had been carried out for the surface mine. He also concluded that these reserves could extend to greater depths, resulting in a purely speculative reserve of 15.2 million CMT. Mr. Stephenson indicated that his estimation of operating costs would be comparable to CRC's estimate of $27.50 per CMT.

In his report, Mr. Stephenson also examined three different underground mine cases, all of which involved different reserve estimates and different annual production capacities. When evaluated against current market conditions, he concluded that underground mining, even at an

unrealistically high production rate and assuming the highest possible coal price, was not economically feasible. Mr. Stephenson found that none of the cases he examined would have been feasible given that the total cost of production ranged from $50.94 to $61.10 per CMT at the mine. Mr. Stephenson concluded that the underground scenario would add $20.00 per CMT to the cost of producing coal compared to surface mining and indicated that it was unlikely that additional exploration drilling would change these conclusions.

In conclusion, Mr. Stephenson stated that he found himself in agreement with the findings presented by CRC regarding the absence of potentially economically viable underground reserves at the Cheviot site. He indicated that underground mining operations at the Cheviot Project site would not have been competitive with the proposed surface mining operation. Furthermore, given the export coal pricing limits applicable at that time and into the foreseeable future, they would have resulted in a nonviable project. He also noted that underground mining would have resulted in a significant detrimental impact on overall recoverable coal reserves.

4.4 Views of the Panel

Given the overwhelming weight of evidence with respect to the underground mining alternative, the Panel continues to conclude that underground mining at the Cheviot Project site is not, with current technology, economically feasible. The Panel notes that this was a consistent view among the various government experts, consultants for CRC, and its own specialists.

With respect to the relative impacts of underground mining when compared to surface mining, the Panel also concludes that for two mines of similar size any adverse environmental effects from either would be insignificant, given the limited amount of coal available from an underground mine at the Cheviot location. The Panel notes that the footprint for either the potential underground development or an equivalent surface mine development would be significantly smaller than for the proposed Cheviot Coal Project. Given that with few exceptions, the adverse effects of the much larger mine are not significant, it can be reasonably concluded that the environmental effects from either of the two smaller mine scenarios will be insignificant.

Finally, the Panel concludes that while a much smaller underground mine would not have as great an environmental effect as would the proposed surface mine, this is not a valid comparison. The Panel reaches this conclusion since the coal resources physically available using current mining technology would not in any way meet the economic requirements of the company. The Panel notes that CRC argued, under Section 16(2) of the *CEA Act*, that only technically and economically feasible alternative means would be required to undergo an environmental comparison. This seems to be a very reasonable interpretation of the meaning of the *Act*, since it is hard to imagine that Parliament would have expected applicants to carry out an environmental assessment of projects that were not technically or economically feasible.

The Panel notes that even if underground mining were feasible, it is clear that the potential underground mine option would soon reach the end of its economic life (i.e., within two to three years), assuming that the company produced and marketed coal at the expected rates. The company stated that it would then reapply for a surface mine development that would not be

significantly dissimilar to the current proposal. As a result, any reductions in the eventual overall impacts that would occur should only the underground mining alternative be developed at this time would not be realized in the foreseeable future. Therefore, the Panel concludes that there is no real reduction in the eventual cumulative adverse environmental effects associated with the underground mining alternative.

The Panel notes the criticisms of the approach used by CRC to compare the relative effects of the underground versus the surface mine options. At the same time, the Panel can understand the conundrum that such an "apples/oranges" comparison can create. The Panel expects that when the *CEA Act* was created, it was assumed there would be a reasonable opportunity for direct comparisons among feasible alternatives. Because of the lack of an economically feasible underground alternative, no such comparison is possible in this case, which emphasizes the difficulties inherent in attempting a comparison of the environmental impacts of two very dissimilar projects. The Panel is satisfied, under the circumstances, that it has the information required to make an appropriate comparison of the environmental effects of the proposed surface mine and the underground mining alternative and to reach conclusions.

The Panel is also not convinced by the position of Environment Canada that some other approach to the environmental comparison than that used by CRC would have somehow resulted in a significant opportunity for additional improvements to the proposed Project. While ongoing research into and refinement of the Project required under provincial approvals will very likely continue to reduce its impacts, the Panel is unable to conclude that this could have been better accomplished through a comparison of the proposed surface mine with a much smaller underground mining scenario.

At the hearing, the AWA Coalition took the position that the Panel is obligated to also further consider other alternatives available to the company. The AWA Coalition suggested that these alternatives included the option of developing other mining properties and the option of not developing the mine at all and devoting the land that the Project would otherwise occupy to support regional ecological integrity. The AWA Coalition also suggested that alternative approaches to carrying out surface mining, such as not placing waste rock within valleys, should be re-examined.

The Panel cannot agree with the AWA Coalition on these points. First, Justice Campbell's directions with regard to which alternatives to the Project should be compared were clear and restricted to a comparison between underground and open-pit mining. Second, it is clear from the record at both hearings that the applicant, CRC, owns and operates only one existing mine which is nearing the end of its economic life. No alternative mines under its control exist to meet its economic objectives. While the companies that own CRC each have other economic interests, CRC stated that it does not have the authority to require these entities to turn over to the company control of these other mining interests. The Panel accepts this as reasonable. Therefore, the applicant does not have before it alternatives to the proposed Project other than purchasing other existing mines or mine properties or the use of other technologies such as underground mining. The Panel notes that the option of purchasing other mining properties was addressed in the original hearing and Justice Campbell did not question the Panel's findings on this issue. The

second alternative, i.e., the use of alternative technologies, has in the Panel's view been thoroughly addressed in its original report and above. With regard to the alternative of not developing the Project, the issue of Project need was, the Panel believes, addressed appropriately in *Decision 97-8*. The relative social and economic benefits of not developing the Project are also addressed in Section 10 of this report.

With regard to the further modifications to CRC's mine development plan proposed by the AWA Coalition, (i.e., the avoidance of the use of riparian areas for rock dumps), the Panel again notes that Justice Campbell gave no direction on this issue. The Panel heard extensive evidence during the first hearing with regard to relative impacts to Project economics based on the distance of haul for waste rock and on the environmental impacts of the waste disposal options proposed by the company. The Panel continues to believe that its original findings on these matters remain appropriate. No evidence was provided at the reopening of the hearing on this issue that would cause the Panel to vary its original decision made under provincial authority or to alter its recommendations to the federal government.

5 ADEQUACY OF CEA SCOPING

As noted earlier, the Panel was charged by the federal courts to examine the cumulative environmental effects of the Project relative to two other industrial activities in the region, notably forestry and other surface mines. However, the Panel believes that in order to properly address cumulative effects, it was potentially insufficient to look only at these sources of impact if other forms of significant disturbance (e.g., oil and gas development) were also occurring. It was also necessary to ensure that appropriate receptors of such impacts (i.e., VECs) be selected.

The Panel believes that the most significant impacts of the regionally dispersed developments of these other industries might differ substantially from the more localized impacts of a mine. VECs therefore had to be chosen to include potentially significant cumulative impacts of both the mine and the other developments and activities taken together. Finally, it was necessary to select the appropriate time and spatial scales for addressing these potential cumulative effects.

The Panel notes that the *CEA Practitioners Guide* has been developed by CEAA to assist applicants in their analysis of cumulative effects. This document was used by CRC in preparation of its reports, as well as by the interveners. While CEA is a relatively recent requirement of EIA, CEAs build upon the basic principles that have been learned and applied in routine EIA practice for many years. Table 3, below, taken from the guide, describes the relationship of the "basic" EIA process and how those steps relate to CEA. The Panel includes the table in this report, since it offers a reasonable and practical framework for carrying out CEA.

Table 3. Assessment Framework*

Basic EIA steps	CEA tasks
1. Scoping	· Identify regional issues of concern · Select appropriate regional VECs · Identify spatial and temporal boundaries · Identify other actions that may affect the same VECs · Identify potential impacts due to actions and possible effects ·
2. Analysis of effects	· Complete the collection of regional baseline data · Assess effects of proposed action on selected VECs · Assess effects of all selected actions on selected VECs ·
3. Identification of mitigation	· Recommend mitigation measures
4. Evaluation of significance	· Evaluate the significance of residual effects · Compare results against thresholds or land-use objectives and trends ·
5. Follow-up	· Recommend regional monitoring and effect management

*From CEAA *Practitioners Guide*

In addition to the information detailed in the *CEAA Practitioners Guide*, Dr. Ross, the Panel's consultant, described his views on the fundamental requirements of CEA. In his evidence, Dr. Ross stated that in all cases appropriate CEAs should include the following process steps:

1) Identify VECs affected by the proposed Project.

2) Determine what other past, present, and future human activities have affected or will affect these VECs.

3) Predict the impacts on the VECs of the Project in combination with the other human activities, and determine the significance of the impacts.

4) Suggest how to manage the cumulative effects.

This section of the report examines the scoping of the CEA in terms of the identification of sources of impact, VECs, and the temporal and spatial scale of the assessment.

5.1 Other Sources of Impacts

5.1.1 Views of the Applicant

In its new submissions to the Panel, CRC confirmed its earlier views that, in addition to forestry and surface mining development, the primary sources of other significant impacts in the region would be from oil and gas development and from recreational activity. CRC provided a summary of regional projects and activities whose effects might interact with those of the mine. With respect to mining, CRC reviewed existing coal leases and plans and provided both maps and anticipated time lines for their development (Figure 2). CRC also considered the prospects for mining of other minerals. With respect to forestry, CRC provided a discussion of the most likely forest development scenario, including the anticipated area to be harvested (Figure 3) and associated road construction. With regard to oil and gas development, CRC indicated that this would include seismic, drilling, and operational activities, such as processing plants, compressors, and pipelines. CRC noted that oil and gas exploration would be largely restricted to the northeast portion of its cumulative effects study area, limiting the potential for interactions with the mine. Recreational activities identified by CRC included both mechanized (e.g., off-highway vehicles) and non-mechanized activities (e.g., hiking, camping, hunting). CRC also updated information on regional land use management and discussed the potential for a steady increase in recreational activities in the region to interact with development projects.

5.1.2 Views of the Interveners

In general, none of the interveners questioned CRC's selection of the primary sources of cumulative effects in the region, although some expressed concerns as to whether the developments and activities identified by CRC were consistently and appropriately treated in the assessments of the various VECs.

5.1.3 Views of the Panel's Consultant

Dr. Ross dealt most directly with the matter of identifying other activities that might have an impact on VECs. He noted that CRC had, in his view, appropriately identified the other human activities to consider in the CEA. He also commended CRC for choosing additional activities beyond those indicated by the courts.

5.1.4 Views of the Panel

The Panel finds that although it was only directed by the courts to consider the cumulative effects of other mine developments and of forestry, clearly it is necessary to ensure that other significant potential sources of cumulative effects are considered. In this case, CRC chose to include regional oil and gas development and recreation impacts in its CEA. The Panel believes this approach is appropriate.

The Panel has considered whether any other sources of regional impacts beyond those identified by CRC would be likely to generate significant cumulative effects in association with the Cheviot Coal Project and has been unable to identify any. The Panel also notes that none of the other hearing participants suggested that CRC's selection of primary sources of cumulative effects was incorrect, although a number expressed concerns over the manner in which these sources were treated in the assessments. The Panel will deal with the issue of how these sources of impact were treated in the assessments of impacts to VECs (Section 7). **Therefore, the Panel recommends that the primary sources of cumulative effects proposed by CRC in its assessment of the cumulative environmental effects of the Project—other mining projects, forestry, oil and gas development, and recreation—be accepted by the federal government as appropriate for the CEA.**

5.2 Selection of VECs

5.2.1 Views of the Applicant

In preparing its supplementary CEA, CRC sought guidance from the Panel as to which VECs should be included. The Panel responded that the federal court had found no fault with CRC's earlier practice of identifying key VECs. The possibility was left open by the Panel that the list of key VECs for the supplementary assessment might need to differ from the list used in the original application. The Panel asked CRC to explain in its written submission the process it used to identify and select VECs.

At the September prehearing meeting, CRC provided a proposed list of nine key VECs but did not explain how they had been selected. The Panel wrote to CRC on September 15, 1999, to request an explanation of the process used to identify and select VECs. CRC responded on September 17, 1999, with an explanation of the selection process it had used. Its approach was also explained in the November 1999 CEA.

CRC stated that it had employed a three-stage process to select key VECs from the list of 99 VECs considered in its 1997 assessment. In step 1, CRC focused on VECs that might experience Project-related effects at a regional scale. This reduced the list to 28 VECs. In step 2, CRC considered the likely magnitude of cumulative effects for each of the remaining VECs based on the earlier assessment and selected those most likely to experience moderately or highly significant effects. This yielded a list of 10 VECs. CRC also sought direction in the major review documents related to the assessment of the Project, i.e., *Decision 97-8*, the *Federal Response to the Decision*, and the court decision. This review yielded 11 VECs, including the 10 based on potentially significant regional impacts.

The final stage was to combine and consolidate the list. This resulted in the 9 VECs submitted to the September prehearing meeting. Finally, the list was reorganized slightly in response to comments received, dividing water quality into two components (sediment and nitrogen) and explicitly adding fisheries.

CRC stated that it had considered the main issues resulting from the EIA scoping exercise and input from the public, regulatory agencies, the federal court review, and the prehearing communications in generating the final list of 11 VECs. The selected VECs were

- surface water quantity
- water quality (sediment)
- water quality (nitrogen)
- fisheries
- vegetation and botanical resources
- wildlife (elk)
- wildlife (selected bird species)
- wildlife (Harlequin duck)
- wildlife (grizzly bear)
- public access-recreation
- traditional use

5.2.2 Views of the Interveners

In both written submissions and oral presentations, some participants challenged CRC's choice of VECs.

Responding to a request from the Panel to review the proposed VECs, provincial and federal government agencies stated that they were generally satisfied with CRC's initial list. However, DFO indicated concern that the aquatic resources VEC did not specifically mention potential impacts on aquatic biota in general and fish in particular. In its November 1999 CEA, CRC noted the concern over impacts to fish and added the fisheries VEC.

Parks Canada expressed the view that CRC's public access VEC should explicitly consider access to Jasper National Park. CRC responded that it felt concerns over access to the park were included in its public access VEC. It responded positively to Parks Canada's suggestion to include a linkage zone analysis to deal with wildlife access issues.

Environment Canada did not comment earlier on the selected VECs but in its submission stated that it disagreed with the applicant's specific choice of species for the selected bird species VEC, particularly neotropical migrant songbirds, stating that all bird species present or predicted to be in the development area should have been assessed. Such an individual assessment would allow one to determine the impact of the development on each of these species.

Trout Unlimited Canada (TUC) and the WCWC argued that a species-specific approach, similar to that used for wildlife, was required for fish species as well, citing the bull trout and Athabasca rainbow trout as examples of species for particular consideration.

The AWA Coalition suggested that the list of VECs be expanded to include wolves, cougars, fishers, lynx, water quality with respect to selenium and heavy metal contamination, human health, food safety, environmentally significant areas, the wildland landscape and opportunities to access it, riparian habitats, and wildlife movement corridors for species other than bears. The WCWC believed that the northern long-eared bat also warranted special attention. CRC responded that some of the species proposed by interveners, e.g., the northern long-eared bat, had been previously assessed and were not likely to experience significant cumulative effects. Others species were represented by the large mammals on the VEC list.

The Mountain Cree Camp Syllabics Institute suggested that with regard to both wildlife and traditional use, precontact trail systems should be included as a VEC.

5.2.3 Views of the Panel's Consultant

Dr. Ross noted that the selection of VECs is a standard approach to scoping environmental assessments and he was pleased that the court did not find fault with the approach. In his first report to the Panel, Dr. Ross concluded that CRC had selected appropriate VECs for its CEA and that the overall selection process was done well. The only minor criticism he had was the focus on VECs of "regional significance." However, Dr. Ross could not think of a potentially significant local cumulative effect in this case and was therefore satisfied with CRC's list of VECs.

5.2.4 Views of the Panel

To meet the directions set out by the federal court, the Panel must be satisfied that the list of VECs chosen from a potentially very large list is adequate to effectively understand the potential cumulative effects of the Project. To ensure that this part of the scoping was adequately done, the Panel sought and received an explanation from the applicant of how the key VECs were chosen. The Panel also had its independent consultant review the selection procedure, and all participants were given the opportunity to review and comment on the VEC selection. The government agencies with specialist knowledge were also specifically canvassed for comment.

No analysis of cumulative effects based on key VECs can provide specific evidence with respect to the impacts on, for example, all species that may be of concern. However, given the complexities of both the natural and social environment and the range of impacts associated with CEA, it would be impossible to assess everything. The Panel continues to believe that the best alternative is to study VECs that are important in their own right and, where possible, also serve as a proxy for VECs that are not studied. The Panel notes, for example, that among the list provided by the applicant, some VECs, such as surface water quantity and water quality, can be a proxy for the broader environmental health of aquatic ecosystems. Others, such as the grizzly bear, are apparently often accepted as indicators of ecological and landscape integrity. The Panel also notes that the issue of selenium, while perhaps not a cumulative effects issue, was nonetheless identified as a VEC due to a recent concern that had been identified related to the issue.

The Panel appreciates that those with particular interests in specific areas would undoubtedly prefer that additional VECs had been selected. The Panel was not convinced, however, by their particular arguments that adding VECs would be of enough incremental assistance to the Panel in assessing the impacts of the Project to warrant their inclusion. The Panel concludes that the key VECs chosen by CRC for the CEA were properly identified early in the process and, given the updated information and analysis provided by CRC, are appropriate. **The Panel therefore recommends that the key VECs be accepted by the federal government.**

5.3 Temporal and Spatial Boundaries

5.3.1 Views of the Applicant

CRC stated that it had developed specific temporal and spatial boundaries for various VECs or groups of VECs. For aquatic issues, for example, watershed boundaries were used as spatial boundaries and river confluences were used as impact assessment locations. The assessment area considered for assessing regional cumulative effects was the McLeod River watershed to its confluence with the Athabasca River (Figure 4). Temporal boundaries for aquatic issues were chosen at 2000, 2010, and 2025, giving current baseline, mid-term, and end-of-mine-life scenarios.

For vegetation and botanical resources, the geographical limits of analysis were based on the Cheviot Cumulative Effects Modelling (CEM) Area, a 3040 square kilometre (km^2) region within 25 km of the proposed mine site encompassing the eastern portion of Jasper National Park to the west and parts of Weldwood's Forest Management Agreement (FMA) to the east (Figure 5). The most comprehensive ecological classification was available for this study area. From a temporal aspect, baseline (year 2000) and end-of-mine-life (2025) conditions were used for analysis.

For elk, Harlequin ducks, and other selected bird species, the geographic areas used were essentially the Cheviot Project and adjacent lands. For elk, the area was further defined to encompass the area occupied by the affected population and the adjacent population (Figure 5).

For grizzly bears, the choice of cumulative effects study areas was more complicated, and much of the analysis was based upon the results from extensive work in the original application review and hearing. Two overlapping study areas were established to assess regional cumulative effects on grizzly bears, depending on the type of analysis performed. The grizzly bear mortality and population viability analysis (PVA) study area was quite large (55 384 km^2) because these bears are best studied at the regional ecosystem level. The second study area, known as the CEM study area, was used for the road density, habitat effectiveness, security area, and linkage zone analysis (Figure 6). This area was established by forming a polygon with a boundary 25 km outward from the boundaries of the Cheviot Project. Cumulative effects on grizzly bears were assessed over a 25-year time period, corresponding to the end-of-mine life.

Community VEC analyses focused on areas where recreational access occurs (Figure 7). CRC noted that recreational activities remain concentrated in the same locations noted in the original application, i.e., within the Cadomin to Cardinal Divide area along the Grave Flats Road.

Consistent with the approach used in other VEC assessments, the temporal time frame included a current (1999) and end-of-mine-life (2025) analysis.

For the assessment of the alteration of traditional use, emphasis was placed on lands within 25 km of the Project (Figure 8). In a similar manner to other VECs, a current (1999) and end-of-mine-life (2025) time period was considered.

At the hearing, CRC responded to the concerns of some interveners that the company should have used smaller time increments (e.g., every five years) in its CEA. In response, CRC noted that based on its assessment, it had found that much of the regional development appeared likely to show either steady growth or, in the case of other mining projects, relatively little change. For example, although there were a number of applications before the EUB for mine approvals and/or extensions in the region, these were not incremental to existing development in CRC's view. Rather, these new developments would simply replace other existing and nearby mining projects.

5.3.2 Views of the Interveners

Several interveners stated that the assessment should have included shorter intervals along the 25-year continuum to provide greater resolution of impacts. They noted that some VECs might experience significant impacts at some time during the life of the mine that might be overlooked in an assessment based solely on pre-mine and end-of-mine scenarios.

CNF stated that adequate temporal resolution of impacts in the assessment prepared by CRC was of vital importance to the Panel to ensure that it completes its work in a manner acceptable to governments. CNF felt that an analysis of impacts based on five-year intervals would show that those effects are at their greatest throughout the mine development and operation stages. CNF stated that the CEA must be sensitive to the different environmental effects that might arise in relation to different project stages, including construction, operation, and reclamation, in combination with other projects in the study area.

TUC noted that the spatial and temporal boundaries used for the aquatic (water quantity, water quality, and fisheries) analyses were different from those used for the terrestrial analyses. TUC was unsure why different boundaries were used and argued that the results and conclusions were influenced by CRC's selection of spatial and temporal boundaries. With respect to the spatial scope, TUC noted that the selection of a large study area increased the likelihood that an impact would be rated as insignificant because it would be relatively small in comparison. In contrast, the selection of a small study area precluded consideration of incremental and cumulative effects best evaluated over large areas. For example, TUC believed that the relative contributions of mining and forestry-related effects were diminished in the water quantity and sediment analyses by the choice of a large study area. On the other hand, the nitrogen VEC study area was also inappropriate, since it did not consider the cumulative effects of nitrate loading downstream of the town of Edson.

With respect to temporal scope, TUC noted that the CEA for water quality and sediment considered potential cumulative effects at 2000, 2010, and 2025, whereas the CEA for nitrogen

loading considered the effects of mining between 2000 and 2010. The fisheries CEA discussed only the present conditions. TUC argued that consistent projections of future conditions were necessary to facilitate comparisons with disturbance thresholds and the identification of potential conflicts at a regional scale. It was TUC's opinion that the use of different temporal scopes reduced the effectiveness of the CEA and the reliability of the conclusions established for the aquatic VECs.

5.3.3 Views of the Panel's Consultants

The Panel's consultants did not specifically address the temporal and spatial boundaries most appropriate for the Cheviot CEA.

5.3.4 Views of the Panel

The Panel believes that the *CEAA Practitioners Guide* provides some useful guidance on the matter of defining spatial and temporal boundaries:

> The practitioner must determine at what point an effect is trivial or insignificant. Ultimately, the assessment response should be appropriate to the project. Setting boundaries relies less on special CEA techniques than on the time-honoured basics of EIA practice of:
>
> 1. making conservative assumptions about the magnitude and probability of the effect in the face of uncertainty (i.e. assume that effects will be greater rather than smaller),
> 2. relying on professional judgement,
> 3. practicing risk management, and
> 4. using an adaptive approach.

With regard to the spatial boundaries selected, the Panel believes that CRC provided reasonable estimates of the spatial extent of cumulative impacts. In reaching this conclusion, the Panel notes that CRC has attempted, where possible, to link its analysis of regional effects to both the source of the impacts (e.g., forestry, mining, oil and gas, and recreation) and to the nature of the VEC in question (e.g., nutrients, fish, large carnivores, recreational use). The Panel is comfortable that the spatial boundaries chosen encompass the primary areas where cumulative effects are likely to occur without being so large as to dilute the significance of cumulative effects that do occur. While the Panel agrees with TUC's comments that the selection of scale may tend to either mask or accentuate certain effects, this is true irrespective of the scale selected. In this case, the Panel is satisfied that the aquatic spatial boundaries selected are adequate for the Panel to understand the cumulative effects of other developments in association with the Cheviot Project and to be able to reach the appropriate conclusions.

In assessing whether the temporal scales used are appropriate, the Panel believes that it must confirm that

1) an adequate description of "baseline" conditions has been selected,

2) the long-term impacts of the Project have been adequately incorporated into the CEA, and

3) unique circumstances that may occur during the life of the Project (e.g., a very high but short-term increase in activity in another source of cumulative effects) have been addressed.

In this case, the Panel notes that CRC used present conditions to describe the environmental "baseline" associated with the region. The Panel believes that this is an appropriate starting point for the Cheviot Project CEA and notes that the baseline includes current mining, logging, and oil and gas activities in the region. Since these activities have already received approval, the Panel believes that their inclusion as baseline conditions (as opposed to more pristine predevelopment conditions) is appropriate. There was also no evidence in either phase of the hearing that the current recreational levels are not reasonably representative of baseline conditions.

With regard to assessing long-term regional cumulative effects, the Panel notes that the data submitted by the applicant generally focused on the end of Project life, which is anticipated to occur within 25 years. While it is true that some reclamation work will remain to be completed after that period, the Panel notes that CRC expects to reclaim a significant portion of the site before the mine closes. Therefore, it is unlikely that a significant increase in impacts due to the Project would occur following cessation of mining.

As to the predictions of effects during the life of the Project, the Panel understands the concerns raised by some of the interveners that it is possible that there could be significant increases in external sources of regional impacts that could affect the cumulative effects of the Cheviot mine. However, the Panel could not find any evidence to suggest that this is a likely scenario. First, the Panel agrees with CRC's contention that the "new" mining projects planned for the region are effectively extensions of existing projects. Second, the Panel notes that the forestry information for the region is based on a 10-year planning horizon. No suggestion was made at the hearing by any of the expert participants that forestry activity would increase significantly after that period. Third, based on its own extensive experience with the industry, the Panel believes that the oil and gas development scenarios used by CRC in its CEA are reasonable and that steady growth in activity levels is the most likely scenario. The Panel also sees no reason to expect a major change in recreational activity in the region, with an associated increase in cumulative effects.

The Panel has no reason to believe that any one phase of the proposed mine development will result in a substantial increase in impacts as compared to other phases. The Panel notes that the development of the Cheviot Project represents a series of sequential pit developments. While the Project footprint will increase over time, these increases are gradual and to various degrees mitigated through ongoing remediation. This issue was addressed in some detail in *Decision 97-8* (Appendix 1). The Panel also believes that CRC's CEA does examine the impacts of the operating phase of the Project in a variety of ways. For example, as can be seen in Section 7 of this report, the grizzly bear analysis considers the alienation of habitat through ongoing disturbances over the life of the Project. The aquatic VECs, such as nitrogen and sediment loadings, are also expressed as ongoing impacts over the Project life.

As a result, the Panel finds that both the temporal and spatial boundaries used in the CEA are adequate and will allow the Panel to reach the appropriate conclusions. Therefore, it recommends that they be accepted by the federal government.

6 ADEQUACY OF CEA INFORMATION

As noted earlier, Justice Campbell directed the Panel to ensure that it obtained all available information about likely forestry and mining in the vicinity of the Project. The following is an assessment of the quality and completeness of the information obtained by the Panel in these two areas, as well as for the other two major sources of regional impacts, oil and gas development and recreation.

6.1 Forestry

In its 1997 application to the Joint Review Panel, CRC relied on surrogate data for the Tri-Creeks watershed to assess the likely cumulative impacts of forestry operations near the proposed Cheviot mine. The company noted that it had done so partly because forestry plans were not on the public record and it had been unable to obtain their release. The federal courts concluded that the Panel erred in accepting this surrogate information and found the Panel did not have sufficient information in 1997 about forestry to adequately address the cumulative effects requirement of the *CEA Act*. Moreover, the Panel had an obligation to obtain the information and to use its authority to compel the information if necessary.

In order to comply with the direction from the court, the Panel sought, in advance of the hearing, to ensure that the applicant had been able to obtain the necessary forestry-related information relevant to the Project. The Panel advised CRC that it required the most recent information about forestry and associated land disturbances, such as forestry road construction. This would include, but not be limited to,

- size, location, and timing of future forestry harvests in the study area,
- a description of the vegetation types associated with the forest stands referred to above,
- the uncertainty associated with the plans referred to above,
- a listing of those forestry activities that will affect regional VECs previously identified by CRC, and
- an analysis of whether a significant cumulative effect results from the forestry activity when considered with the knowledge of the Project's residual effects.

The Panel Secretariat also met with representatives of Weldwood and the Land and Forest Service (LFS) of AENV to explain the Panel's need for full disclosure of relevant forestry information.

6.1.1 Views of the Applicant

CRC stated that it chose a 25 km radius surrounding the Project site for its assessment of regional forestry development (Figure 3). CRC noted that Jasper National Park, Weldwood, Sundance Forest Industries Ltd., the Alexis First Nation (AFN), and the Alberta LFS control the

forested areas in this region. CRC provided a discussion of available information on future forestry activities from the present until 2025.

The company noted that most of the relevant harvesting activity will be within the area bounded by Weldwood's Forest Management Agreement (FMA). CRC provided a summary of the anticipated area to be harvested in each of Weldwood's harvest compartments by "forest cover group" for the next three decades, beginning in 1996. CRC also obtained permission to provide the following Weldwood forest planning documents to the Panel in support of its application:

- the 1991 detailed forest management plan;
- the 1998/99 development plan for 1998–2007, including the harvest and road construction schedule;
- the 1999 annual operating plan for May 1, 1999, to April 30, 2000, including cut blocks approved to April 30, 2002;
- the compartment harvest plans, including Embarras 6 & 13, McLeod 3; and
- the harvest planning and operating ground rules, dated January 1, 1996.

CRC also provided the Panel with the Sundance Forest Industries Ltd. preliminary forest management plan,, dated July 15, 1997, and the Jasper National Park management plan concept, dated January 29, 1999.

CRC noted that the documents listed above do not include reference to lands managed by the AFN or the LFS. According to CRC, the AFN had told the company it had no plans at present for commercial-scale logging. The LFS, CRC stated, was developing management plans for provincial lands under its control in the vicinity, including the newly designated Wildhorse Wildland Park and the Coal Branch Forest Land Use Zone. However, no timber dispositions currently occurred in these areas and none were anticipated to be issued.

CRC explained that forestry planning by Weldwood entails a nested series of increasingly detailed plans:

- forest management plan (140-200 years)
- compartment harvest plan (20-80 years)
- general development plan (5-20 years)
- annual operating plan (2-3 years)

The higher-order plans, CRC observed, look farther into the future, are more general in nature, and are more uncertain than the short-term plans. Circumstances or management decisions may alter the long-term vision of the future. The mid-level compartment harvest plans and general

development plans describe the sequencing of areas to be harvested and the associated activities. Precise and spatially detailed forestry activity plans are available for only a few years in the future and only in those areas slated for imminent harvest. To the best of CRC's knowledge, the forestry information it provided to the Panel was both current and comprehensive.

CRC stated that its consultants had employed an ecosection-level land classification approach, in conjunction with forest cover and harvesting plans for Weldwood and Sundance, to assess forestry-related impacts to terrestrial VECs, including effects on vegetation and wildlife habitat. The assessment of forestry-related impacts to aquatic VECs was modelled using Weldwood's compartment harvest plans and an understanding of forestry-related aquatic impacts gained from the experimental Tri-Creek watersheds.

During the hearing, CRC's projections of future forestry-related road construction were criticized because they were based on an approved development plan for the ten-year period to 2007, which is a much shorter period than the time line for the CEA. In response, CRC produced new estimates of potential road densities and revised estimates of habitat effectiveness to the anticipated end of the Project life (i.e., 25 years).

6.1.2 Views of the Interveners

At the hearing, Weldwood confirmed that it holds the FMA that makes up a large part of the cumulative effects study area and is by far the largest forestry operator in the vicinity of the proposed Cheviot Project. Weldwood also confirmed that it provided CRC its approved planning documents and additional information on its ongoing planning activities. In response to concerns expressed by interveners and the Panel's independent consultant that the information before the Panel might not be the most current, Weldwood tendered its draft 1999 detailed forest management plan and noted that it had made this information available to CRC. In doing so, Weldwood stated that while it was prepared to submit these plans at the request of the Panel, it was not its normal practice to make its forest management plans public before they had been approved by the province. However, the company was prepared to do so in the interest of satisfying the Panel's requirement to have certainty with respect to the forestry information used in the Cheviot CEA.

Weldwood asserted that the information provided to CRC and its consultants is the most current information related to approved plans and plans in progress. In the company's view, it represented the most likely future for forest management operations on the FMA area. Weldwood also noted that the draft 1999 forest management plan had been reviewed by the province and that changes based on the review and its own internal review were in progress. However, Weldwood stated that the technical information it had provided to CRC had not been affected by the review.

A number of interveners questioned whether CRC had in fact used the most current information about forestry. They also criticized CRC's use in its application of only approved forestry activities and the associated road construction plans as a basis for assessing future impacts. For example, they noted that CRC used the scheduled cut of 4686 hectares (ha) of forest in the approved plans in assessing cumulative effects on grizzly bears even though this represented less than 15 per cent of the scheduled, but not yet approved, 27 017 ha to be harvested in the region

by 2025. They noted that CRC had also estimated the additional length of roads associated with the as-yet-unapproved portion of the forest management plan to be between 297 and 560 km. At the hearing, the ACC/ANPC sought to clarify some aspects of Weldwood's road construction plans. Weldwood explained that class-2 roads would be built between compartments and a class-2 haul road would be constructed between the Grave Flats Road and Mercoal.

6.1.3 Views of the Panel's Consultants

In his initial assessment of CRC's forestry submissions, Dr. Peterson stated that he found that CRC had failed to meet the Panel's request to provide the "description of the vegetation types associated with the forest stands" requested by the Panel. In his view, the "forest cover groups" used in Weldwood's compartment schedules could not be translated into vegetation classes. Further discussion with Weldwood and CRC, however, satisfied Dr. Peterson that the eight forest cover groups used could be stratified into the more detailed vegetation types. Furthermore, CRC also had access to data, by forest compartment, of areas not occupied by forest (e.g., water, grass and shrubs, industrial sites, and linear disturbances). With this clarification, Dr. Peterson said that the data provided by CRC did provide adequate stratification for the prediction of the cumulative effects of forestry operations. Dr. Peterson also stated that he was satisfied with the geographic scale of CRC's forestry-related information.

Dr. Peterson initially also questioned the value of much of the material provided by CRC to the Panel. He noted that documents such as Weldwood's "Harvest Planning and Operating Ground Rules" and the LFS "Interim Forest Management Guidelines to Plan Development" are not specific to the terrain, forest ecosystems, or operating conditions in the region. Others were of questionable value, in his view, because they were out of date or would soon be superseded. In particular, he observed that Weldwood's 1991 detailed forest management plan was developed based on 1990 information and was intended as a guide to operational planning until June 1998. The annually revised development plan and the compartment plan, he said, could be affected by the draft 1999 forest management plan. This left the "size, location, and timing of future forestry harvests in the study area" in doubt. However, CRC and Weldwood later clarified that CRC was provided the opportunity to review the draft forest management plan. As a result of learning this, Dr. Peterson stated that the Panel could be confident it had obtained up-to-date information on the size, location, and timing of future forestry activities in the cumulative effects study area.

Dr. Ross, in his assessment of the CEA, said that he had difficulty determining what information and assumptions about future forestry activities were included in the assessments of impacts for the various VECs. The analyses applied to the grizzly bear assessment, for example, were divided into a full quantitative analysis based on the approved compartment plans and a supplementary analysis of anticipated but nonapproved forestry activity. The same approach was not applied to the other VECs.

CRC responded that the approaches and methods used to assess the various VECs were different but in each case a description of the forestry activities included in the assessments was provided. Dr. Ross did state that he supported CRC's attempt to forecast the "most likely" scenario for future forestry. He also expressed the view that greater spatial detail was not necessary and the schedule of areas to be harvested was an adequate description of forestry activities for the purposes of the CEA.

6.1.4 Views of the Panel

The Panel believes that it must be satisfied that the forestry-related information it has obtained is current, comprehensive, and was used to assess the forestry-related cumulative effects on VECs. With regard to the first question, the Panel believes that it has available the most recent relevant forestry data for the region. With regard to the second question, the Panel is satisfied that CRC also had access to and made use of that data. The Panel notes that this view was also shared by its independent forestry consultant. The Panel was not made aware by any of the parties at the hearing of any other regional forestry data that would be either as relevant or comprehensive.

The Panel greatly appreciates Weldwood's role in volunteering this essential information to the applicant and the Panel. Clearly, various aspects of Weldwood's forestry operations will eventually vary from the current plan, particularly further into the future. However, the Panel believes that the data provided by Weldwood do represent its best views and those of the province regarding the most likely forestry development scenarios.

The Panel also notes that not all of the available forestry data fit easily into CRC's requirements to predict forestry activity at the regional landscape scale for 25 years. These were dictated by the requirements of the spatial and temporal scales selected for the CEA and were not part of Weldwood's planning needs. Despite these limitations, the Panel believes CRC was able to adequately integrate the available forestry data into its CEA and made appropriate use of the timber harvest schedules and compartment sequences in the forestry management plan and the 1999 development plan.

While the Panel is satisfied that the consultants who prepared the CEAs for the various VECs on behalf of CRC had access to the most recent forestry information, the Panel shares Dr. Ross's concern as to whether the same assumptions about future forestry activities were employed in each case. The Panel understands and accepts CRC's point that it was appropriate that different methods and approaches were adopted in the CEA for the various VECs. However, in the Panel's view, this observation does not bear directly on Dr. Ross's concern. In CRC's response to Dr. Ross, descriptions such as "forest management plans of Weldwood were utilized" were no doubt intended to convey something specific. Unfortunately, they do not adequately clarify what assumptions were made with respect to the inclusion of approved and nonapproved harvesting activities and the associated road developments. The Panel will therefore be mindful of Dr. Ross's caution in reviewing the assessments of impacts to the VECs.

6.2 Other Mining Activities

In August 1999, the Panel directed CRC to assess the extent of likely mining activities identified in Justice Campbell's ruling. In its direction, the Panel noted that six projects had been identified as being at the preliminary disclosure stage during the 1997 hearings.

The Panel requested that the following be included in the assessment:

- the location and timing of current and future mining operations in the study area,

- the uncertainty associated with the mining operations referred to above,
- a listing of those mining activities that will affect regional VECs previously identified by CRC, and
- an analysis of whether significant cumulative effects will result from the mining activity when considered with the knowledge of the Project's residual effects.

CRC responded to this direction in its supplemental information submission dated October 1999. Seven proposed mining projects were identified within the Cheviot CEA (Figure 2) by CRC. CRC also provided the Panel with copies of the preliminary disclosure documents for the projects. CRC requested the Panel's assistance in confirming that the number of projects had been correctly identified at the preliminary disclosure stage. Confirmation was obtained through correspondence with the Alberta Department of Resource Development (DRD) in a letter to the Panel from Mr. Ken Smith, Deputy Minister, DRD, dated November 29, 1999.

6.2.1 Views of the Applicant

CRC advised that it had reviewed the preliminary disclosures for the seven mine projects. Through inquiries to the EUB and the DRD, it determined that no other mines had been identified within the Cheviot cumulative effects study area. Except for extensions to existing mines, no new mines other than Cheviot were anticipated before 2025, i.e., the end of the Cheviot Project.

6.2.2 Views of the Interveners

With the exception of the AWA Coalition's contention that the Cadomin East coal lease had not been adequately considered as an alternative, none of the interveners provided further comments with respect to the potential for other mining projects in the region beyond those considered by CRC.

6.2.3 Views of the Panel

The Panel is satisfied, given the inquiries of CRC and the confirmation from DRD, that all reasonably foreseeable mining activities in the vicinity of the Cheviot Project were identified and that all available information required has been obtained.

With regard to the AWA Coalition's comments regarding the Cadomin East property, the Panel is of the view that this matter was thoroughly addressed in *Decision 97-8* (pages 16-21).

6.3 Oil and Gas

6.3.1 Views of the Applicant

According to CRC's research, 27 energy companies held 135 petroleum and natural gas dispositions (leases and licences) either partially or entirely within the CEM study area at the time of CRC's report submission. These dispositions occupied about 18 per cent of the land within the study area. All of the dispositions fell along the eastern portion of the study area within Bear Management Unit (BMU) 3 (Figure 6).

In 1999, CRC reported that there were 64 wells in the CEM study area, of which 15 produced natural gas. Associated with those wells were 45 access roads and 19 pipelines, traversing 520 ha of land. CRC reported that the terms and conditions of those petroleum and natural gas dispositions dictated that a minimum of 70 additional wells would need to be drilled prior to their expiration dates if the companies were to retain their mineral rights.

CRC noted that four new gas wells and associated access roads and gathering pipelines were constructed in the region in the year prior to its submission. CRC stated it surveyed the eight energy companies holding the majority of the petroleum and natural gas dispositions in the CEM study area for their future plans. Given the more recent increase in prices, the survey suggested that a minimum of 15 to 20 wells could be drilled each year in the study area over the next five years. CRC noted that it was not possible to identify the specific sites where disturbance would occur and that predictions of actual development activity levels were difficult to make.

CRC stated that the location of the oil and gas leases clearly reflected the most likely zones of potential activity and the possible future trends for oil and gas development in its CEA. CRC observed that the western extent of the leases was roughly located at the McLeod River/Mackenzie River confluence. Drilling activity was expected to spread farther north and west into the foothills along the Rocky Mountains, including within the Coal Branch Integrated Resource Plan (IRP) planning area.

During the hearing, CRC provided further extrapolations on the potential for road development associated with oil and gas activity in order to estimate potential cumulative effects over the 25-year temporal boundary used in the CEA. It was suggested that an additional 786 km of new oil and gas road development could be assumed over this period.

CRC noted that no cumulative effects of oil and gas activity on the public access-recreation VEC were expected because no oil and gas activity was anticipated in the area assessed for this VEC, i.e., the Cadomin to Cardinal Divide corridor near the Grave Flats Road.

6.3.2 Views of the Interveners

Parks Canada stated that CRC's initial submission appeared to lack sufficient data on linear and point disturbances associated with oil and gas exploration and development. Parks Canada felt that because the oil and gas trend data had not been integrated into the analysis (out to the year 2025), it was likely not reflected in the determination of significance for cumulative effects.

The AWA Coalition stated that based on the predicted oil and gas development in the CEA study area, together with the current activity, the level of future oil- and gas-related industrial activity was substantial and should have been considered in the CEA.

TUC was of the opinion that the evaluation of other existing and potential activities by CRC within the CEA study area, including the potential oil and gas activity in the McLeod River watershed, was inconsistent. TUC stated that none of the analyses quantified the potential effects of the existing road network or future oil and gas activities on flow patterns, sediment yield, water quality, or fisheries in the McLeod River watershed.

TUC stated that the area cleared for seismic lines, pipeline rights-of-way, roads, well sites, and facilities associated with oil and gas operations in the Eastern Slopes frequently equals or exceeds that associated with forest development. TUC noted that CRC's grizzly bear CEA reported that linear features associated with oil and gas activity were clearly significant at the regional scale.

The WCWC said that, in its view, CRC had neglected to account for the known negative impacts of oil and gas development in its analyses of grizzly bear habitat.

6.3.3 Views of the Panel's Consultant

In his first submission, Dr. Ross stated that while the oil and gas activities identified by CRC seemed reasonable, the actual CEA seemed to assume zero petroleum activity. Dr. Ross viewed this as a minor flaw, however.

In a second submission to the Panel, Dr. Ross stated that he now believed the consideration of petroleum and natural gas development in the CEA appeared to assume these activities would cease in 2008. However, the grizzly bear VEC analysis appeared to assume that oil and gas activity would continue through to the year 2025. The latter assumption, he believed, seemed to be more reasonable.

6.3.4 Views of the Panel

The Panel agrees with CRC that accurately predicting the future levels of oil and gas development within the CEA study area is complex. The uncertainty as to where these resources are actually located, the large number of companies involved in development, their competitive nature, and the sensitivity of activity levels to prices make predictions of future development difficult. Nonetheless, the Panel believes that consideration of oil and gas developments and the access (road and pipeline) created by exploration activities must be considered when assessing the regional cumulative environmental effects of the Cheviot mine. Therefore, the Panel concludes that the inclusion of these impacts into its CEA is reasonable.

The Panel notes that it was not always clear in CRC's 1999 CEA how far into the future CRC considered the cumulative effects of oil and gas development relative to the various VECs. However, this question was addressed to a significant extent by CRC in the hearing and the Panel now believes that the information base relative to oil and gas is sufficient for the Panel to be able to assess these impacts over an acceptable time frame and reach appropriate conclusions.

6.4 Recreation

In the prehearing report, the Panel noted that since cumulative effects include "the total of disturbances similar to those related to the proposed activity," its review may need to consider motorized recreation and other sources of similar disturbance that may interact with the Project. In response, CRC provided an update of current recreational activities in the vicinity of the Project and a prediction of future recreation. This information was used both as part of the basis for determining cumulative effects of the Cheviot Project on other VECs and as background information for the public access-recreation VEC used in the CEA.

6.4.1 Views of the Applicant

CRC stated that it viewed recreation as falling into the category of "induced actions," which it considered "unregulated, uncertain, dispersed, regional and the responsibility of regional land management agencies." To predict future recreational trends to 2025, CRC indicated it had assumed continuation of current trends as determined through consultation with AENV staff, representatives of recreation user groups, local business operators, researchers with the Foothills Model Forest, and other CRC consultants. CRC also provided updated estimates of recreational activity in the area based on an analysis of overnight use of Whitehorse Creek and Watson Creek campgrounds. For its analysis, CRC stated it had focused on the Grave Flats Road from Cadomin to the Cardinal Divide and on either side of the road where recreational access occurs.

Overall, CRC predicted an annual 3 per cent rate of growth in recreational activity during the period to 2025 and used this as the basis for undertaking its CEA. CRC noted that recent annual increases of 5 to 10 per cent observed at campground facilities in the area were likely attributable to the creation of the Whitehorse Wildland Park and that a 3 per cent annual growth rate was more consistent with longer-term trends observed in the region. According to CRC, some implications of growing recreation demand would include increased recreational activities associated with new roads developed as part of future forestry operations. It may also include additional recreational use of reclaimed lands at area coal mines and increased use of the area east of the mine as off-highway vehicle (OHV) use is displaced from Mountain Park by the Cheviot mine.

6.4.2 Views of the Interveners

Although most interveners did not question CRC about the rate of recreational growth used in the CEA, there were a number of questions and concerns about the lack of detailed estimates of the types of recreational activities that would occur and how these activities would be distributed throughout the region. For example, Parks Canada believed that CRC's assessment did not use all available data and that the lack of spatially explicit information on future recreational activity had caused considerable uncertainty in the analysis of cumulative effects.

The ACC/ANPC also argued that the recreational analysis was incomplete for a number of reasons. First, there was, in its view, insufficient information on the regional distribution of future recreational activity to allow the adequate assessment of the potential impacts on grizzly bears and Harlequin ducks. Second, the ACC/ANPC was critical of the recreation analysis because it did not clearly differentiate between motorized and nonmotorized recreation, and it

felt that a more accurate assessment of OHV use was required for a complete assessment of cumulative effects. It noted that the physical disturbances associated with OHV use in the area were poorly documented, and it offered evidence to suggest a single OHV could have from 300 to 1000 times the impact of a hiker. The ACC/ANPC's concern was that OHV use in the backcountry is increasing and that unless better data were available, the resulting impacts on grizzly bears could not be adequately addressed in the analysis of habitat effectiveness or security analysis.

AENV observed that, in its view, future recreational development was unlikely to occur in areas away from the existing roads.

6.4.3 Views of the Panel's Consultant

Dr. Ross concluded that the examination of recreational activities as part of the CEA was an excellent idea, and he expressed no concerns about the adequacy of the information. However, initially he did raise some questions regarding how the assumptions about increasing recreational demand had been factored into the analysis of the various VECs, especially since the compounding effect of 3 per cent annual growth in recreation over 25 years would result in activity levels significantly greater than at present. These questions, he later concluded, were largely addressed in subsequent submissions provided by CRC.

6.4.4 Views of the Panel

The Panel notes the views of all the parties to the hearing that recreational activities are a significant potential source of cumulative impacts in the region. This is consistent with the conclusions of the Panel in its previous report, and the Panel continues to hold this view. With regard to whether the data used were the best available, the Panel recognizes that, unlike forestry or mining, where it is common practice to develop long-term plans that can be referenced in a CEA, future changes in recreational activity are much more difficult to predict or anticipate. As a result, the Panel concludes that the predictions based on the subjective, and in some cases expert, opinions of the various regional business operators and regulators who were interviewed by CRC are the best available estimates. The Panel also concludes that it does have sufficient information to reach justifiable conclusions with regard to the cumulative impacts of the Cheviot Project in association with regional recreational development.

The Panel does accept Parks Canada's view that in order to effectively assess the future effects of regional development, including recreation, on Jasper National Park, the ongoing monitoring of human and wildlife use of the high mountain passes between provincial lands and Jasper National Park will be needed. However, the Panel does not believe that in this case it would be fair or appropriate to require a single proponent, such as CRC, to collect these data on a number of regional sources of impacts, most of which are not directly or even indirectly related to its proposal. Based on the testimony provided by Parks Canada, such data would seem to be critical to Parks Canada meeting its own mandate to protect the Jasper National Park's ecological integrity, even in the absence of the Cheviot Project. **The Panel therefore recommends that Parks Canada immediately initiate a program to monitor and report on recreational activity levels in these passes into Jasper National Park.**

7 ASSESSMENT OF CUMULATIVE EFFECTS

7.1 Aquatic VECs

7.1.1 Views of the Applicant

In the 1999 CEA, CRC identified four aquatic VECs for consideration. These were

- surface water quantity,
- water quality-sediment,
- water quality-nitrogen, and
- fisheries.

CRC noted that its most recent findings with regard to aquatic impacts had remained consistent with those of the original Project application. Therefore, it took the position that the additional investigations carried out since that time had only served to increase its confidence in the results and conclusions derived previously. The aquatic VEC study areas are shown in Figure 4.

Surface Water Quantity

With respect to water quantity, CRC stated that it had examined three indicators—peak, annual, and low flows—in order to describe the effects of the Project and other regional sources of impacts on the regional water regime. CRC noted that changes in the flow regime can, in turn, alter a number of components of the local stream ecology by altering habitat conditions. The applicant identified a number of mining activities that could impact the quantity of surface flow, including clearing prior to mining, stripping and stockpiling the overburden, dewatering of groundwater prior to mining, pit dewatering during mining, end-pit-lake filling, and reclamation and revegetation activities. CRC concluded that mining would result in increased low flows during the premining and pit dewatering stages, as well as during the winter period as a result of drawdown of end-pit lakes, while storm water retention in the active pits and end-pit lakes, as well as the porous nature of the rock dumps, would reduce flood peaks. CRC indicated that the filling of end-pit lakes could be accomplished in such a way as to avoid negatively affecting downstream flows. The overall net effect of mining was believed to be increased low flows and a reduction in peak flows.

CRC also assessed the impact of other mining projects in the CEA study area, forestry operations, oil and gas projects, and the upgrading of Highway 40 on surface water quantity. CRC noted that the proposed mines in the vicinity of the Project would replace depleted mines, rather than add to their number. CRC, in fact, expected the number of mines to decrease over the 25-year period selected for the assessment. Therefore, it was assumed that the future effect of other regional mines would not change significantly from the existing baseline conditions.

With regard to impacts from the proposed forestry operations, CRC noted that studies of forest harvesting in similar watersheds suggested that runoff from April through September increased, as did annual peak flows following logging. The applicant predicted that the impact of oil and gas development, the upgrading of Highway 40, and future recreational activities on the quantity of surface water flow would be insignificant.

Overall, CRC concluded that there would be no significant adverse cumulative effects on surface water flows. In the short term, mine development would cause a minor increase in peak flows due to clearing and pit dewatering, while forestry operations would also increase peak flows and annual flows. With limited harvesting in the early years of the mine, the combined cumulative effects of the two industries would be minor. In the longer term, the cumulative effects of the Cheviot mine would include an attenuation of peak flows due to storage in end-pit lakes, increased low flows in winter, and a slight decrease in annual flows. The impacts of forestry, CRC predicted, would counteract and overwhelm the impacts of mining. CRC estimated, for example, that an 8.2 per cent increase in annual flows on the McLeod River downstream of Mckenzie Creek due to forestry operations by the year 2025 would overwhelm the anticipated 1.1 per cent decrease due to mining.

Water Quality—Sediment

With respect to sediment loading and its impact, CRC indicated that it had not changed its original conclusions with respect to the Project and that the findings in the Panel's previous report remained correct. Those findings included the conclusion that although the nonmining components of the Project would have little or no effect on sediment levels, numerous sources of sediment would be generated as a result of a large surface mine. However, these impacts could be mitigated through the use of settling ponds and similar control features, including the proposed end-pit lakes during both the mining and postmining period.

CRC also assessed the cumulative impact of other mining projects in the CEA study area, as well as the impact of forestry, recreation, and oil and gas development on sediment loading. Again, it was assumed that the effect of other regional mines would not change from present conditions and would be comparable to that of the Project and, as a result, not have any long-term negative impacts either individually or collectively.

CRC reported that studies on the impact of forest harvesting in similar watersheds found that there were changes in the average annual suspended sediment yield in some studies and that peak sediment loads increased significantly during road construction and logging periods. CRC reported that due to the nature and relatively low level of recreational activity in the Project vicinity (primarily OHV crossings of creeks and watercourses), even if recreational levels doubled over the life of the Project, this was expected to have a negligible effect on sedimentation.

The only oil and gas operation CRC discussed as potentially contributing to sedimentation was pipeline construction, which the company noted was reported to increase sediment concentrations, though the magnitude of impacts depended on numerous other variables. CRC noted that if either forestry or oil and gas sediment-inducing activities occurred concurrently with the construction of the road and rail to Cheviot and a major storm event occurred, there could be a cumulative effect on sediment during this short-term construction phase. However, long-term cumulative effects were not anticipated during the operations phase of the mine due to the presence of effective sediment control systems.

CRC concluded that the cumulative effects on sedimentation from the mine in association with the various other activities considered were not significant. CRC recognized that minor adverse effects might occur in the short term as a result of mining in combination with other activities in the drainage basin, especially during heavy rain or snowfall events. However, CRC argued that such events would have a corresponding impact on the sediment concentrations in natural watersheds and that sediment concentrations would return to pre-event levels one to several days following the event.

The applicant noted that it planned to mitigate any negative effects from sediment loading by implementing sound sediment control measures at the Cheviot Project. CRC concluded that the long-term effect of the Cheviot mine, and potentially other mines as well, on regional sediment loading would in fact be positive, largely due to the end-pit lakes controlling sediment loads. As a result, no significant cumulative effects were predicted either during the life of the Project or following closure of the mine.

Water Quality—Nitrogen

With regard to nitrogen loading, the second measure of water quality considered by CRC, the company noted that the Panel stated in its 1997 report that there was some risk of regional impacts (i.e., eutrophication) if nutrient loading were not carefully monitored and controlled. Eutrophication, or the overenrichment of surface waters with nutrients, results in increased productivity of aquatic plants and is normally regarded as undesirable. CRC observed that the Panel also noted that there would be a period of some unknown length when nutrient loading from both mines (i.e., the existing Luscar mine and the Cheviot mine) would occur. Therefore, the Panel had highlighted the importance of an adequate monitoring program to determine whether nutrient loading was creating a risk of downstream eutrophication.

In order to respond to the Panel's earlier concerns, CRC stated that it had conducted a number of water quality studies to assess the eutrophication potential in the upper McLeod River. In addition, the company noted that AENV had conducted seasonal water quality surveys to measure nitrogen concentrations in the upper McLeod River.

CRC stated that it had used nitrate loading as an indicator of cumulative effects from nitrogen, since nitrate is a byproduct of blasting used in mining operations and has been identified as the main form of nitrogen leached from coal mines into receiving waters. In order to assess the potential effects of elevated nitrate-nitrogen levels in the receiving waters, CRC conducted surveys on epilithic (i.e., attached) algae, which are the main primary producers in the streams and most likely to be affected by high nutrient loads. Those studies concluded that the algae were largely unaffected by discharges of water containing high nitrogen concentrations. CRC attributed this result to the relatively high velocity of the river, which appeared to prevent excessive amounts of algae from accumulating, and to the low levels of phosphorus, which was the limiting nutrient required for increased primary production in the stream water.

CRC established a list of activities that it believed had the potential to impact water quality. These included coal mining, timber harvesting, natural gas exploration, limestone quarry development, residential areas, tourism, and random recreational activities. For the purposes of

the CEA, it was assumed that the level of industrial and other activities would remain largely unchanged until 2010-2011. Beyond 2011, mining levels were projected to decrease. Timber harvesting activities and other commercial land uses were assumed to continue at approximately the same rate as at present.

CRC stated that it had estimated a maximum annual loading of nitrate-nitrogen to the McLeod River drainage system from mining operations, including the Luscar mine, the Gregg River mine, and the Coal Valley extension. The applicant noted that there would be a period of overlap, while the Luscar mine was winding down and the Cheviot mine was preparing for full production, during which there would be cumulative nitrogen inputs from both operations. During this transition period when both mines could be operating at maximum capacity, CRC estimated that the total loading of nitrate-nitrogen could be approximately 15 per cent greater than the nominal annual maximum.

The maximum nitrate-nitrogen concentration, when mixed with the average annual flow of the McLeod River, could be expected to be approximately 0.5 milligrams per litre (mg/L) in the river above the Embarras River confluence and was estimated to be 0.2 mg/L at the confluence of the Embarras and McLeod Rivers. These levels were both noted to be below the Alberta Surface Water Quality Guidelines (ASWQG) of 1.0 mg/L for total nitrogen. CRC indicated that the ASWQG could be exceeded immediately below the mine settling ponds. This was due to the relatively high nitrate levels in the effluents, which have occasionally exceeded levels of 15 mg/L. CRC also noted that nitrate leaching from waste rock dumps would continue for five to ten years after the mines were closed.

With respect to the forestry impacts on nutrient loadings, CRC acknowledged that Weldwood had reported increases in nutrient export from clear-cut areas from several catchment basins within Weldwood's FMA. CRC stated that another long-term study of the effects of forestry, however, in a nearby watershed, showed significant decreases in nitrate-nitrogen following logging, though decreases in organic nitrogen levels were less apparent. However, the study also detected significant increases in total phosphorus loading. CRC concluded from these results that it did not appear likely that the forestry operations in the McLeod River basin would contribute significantly to the cumulative nitrogen loading. Under questioning from TUC regarding the cumulative effects of the elevated nitrate-nitrogen concentrations from mining operations and the potential increases in phosphorus loading from forestry operations, CRC continued to maintain that there would be no cumulative or synergistic eutrophication effects of the combined nutrient releases.

With respect to the impact of other land uses on nitrogen loadings, CRC stated that it had concluded that the existing Inland Cement limestone quarry did not contribute nitrogen to the McLeod River system. CRC stated that although recreational land uses could affect water quality, it took the position that the effects of recreational activities were insignificant, particularly when compared to the effects of commercial activities. Potential nutrient contributions from the small residential developments within the McLeod River drainage were also not considered to be significant. Water quality surveys conducted in the vicinity of Robb and Cadomin suggested that they did not contribute measurable water quality changes. CRC did note that agricultural

activities were important land uses north of Edson and could be a source of nutrient loading. However, these contributions were outside of the selected CEA study area boundary.
CRC reported that in its view the first major contributor of phosphorus into the McLeod River system was the Town of Edson. CRC believed that Edson was the point at which the cumulative effects of eutrophication should begin to be addressed. CRC stated that AENV had conducted studies on the McLeod River in 1984-1985 to determine the impact of anthropogenic activities. Those studies concluded that the eutrophication effect of discharge from Edson's wastewater treatment plant was evident immediately below the effluent outfall and was caused by elevated concentrations of both nitrogen and phosphorus. However, the report suggested that the assimilative capacity of the McLeod River near Edson was sufficient to rapidly reduce the effects of the enrichment from the sewage outfall.

CRC concluded that the cumulative effects of nitrate-nitrogen loading from the Cheviot mine and other likely developments in the vicinity would be insignificant. While CRC acknowledged that increased levels of nitrogen would occur in the McLeod River below the mining area, it believed that higher nitrogen concentrations, due to phosphorus limitation, would not result in eutrophication. CRC noted that cumulative nitrogen loading was also not projected to exceed surface quality objectives. CRC suggested following up this VEC with periodic aquatic surveys and monitoring of nitrogen releases from regional mine sites.

Fisheries
As a result of DFO's request to have fisheries resources added to the assessment, CRC stated that it expanded its CEA to include fish populations and fish density in the upper McLeod River basin, upstream of the mouth and including the Gregg River (Figure 4).

In CRC's original application, it was estimated that a decline in both fish numbers and biomass would occur in area streams due to the development of the Cheviot Project. It was determined that this loss would be partly compensated for by creating seven end-pit lakes on the Cheviot mine site with self-reproducing fish populations. Subsequent to the original studies, CRC stated that it undertook a more detailed investigation of the end-pit lake known as Lac Des Roches, located on the CRC Luscar mine site. That study suggested that, in part because of the relatively large size of the fish, Lac Des Roches supported significantly more biomass than was expected to be lost from area streams. CRC noted that end-pit lakes also provided overwintering habitat for fish, as well as habitat for different life stages. CRC concluded that, with appropriate monitoring programs to confirm whether or not the mitigation and compensation goals have been achieved, end-pit lakes would provide suitable compensation for the loss of fish populations in the upper McLeod River basin.

CRC stated that it had also assessed the impacts of other coal mining projects on fish populations and habitat in the cumulative effects study area. CRC noted that over the last 30 years coal mining practices had changed and environmental protection regulations had become more stringent. CRC stated that recent studies had shown fish populations in streams on or adjacent to coal mines in the study area to be relatively stable or even increasing. Rainbow trout populations were shown to be relatively stable, with the exception of West Jarvis Creek, and both bull trout and brook trout numbers were shown to have increased over the last few decades. CRC stated

that although the increases could not be directly attributed to more modern coal mining practices and more stringent environmental protection regulations, the information strongly suggested that coal mining had not had any adverse effects on fish populations in recent years and therefore would not have any negative cumulative effects in the future.

With regard to specific mines in the study area, CRC noted that it had addressed the potential negative effects on fish and fish habitat associated with each. CRC concluded that there was no evidence to show that any of the other regional mine operations had had any adverse effects on fish or fish habitat in the study area. CRC also concluded that the Inland Cement quarry was unlikely to have any adverse effects, although no definitive information was available.

CRC confirmed that it had also assessed the impacts of forestry activities in the area on fisheries resources. CRC reported that there had been no documented evidence of a decline in stream fish populations in the current study area that could be attributed to the forest industry. In its assessment, CRC stated that it had assumed that the level of forestry activity in the fisheries CEA study area would be similar to that in the Tri-Creeks experimental watershed study area. CRC noted that as the forestry activities in the Tri-Creeks experimental watershed study area did not have any adverse effects on fish populations, it was expected that future forestry activities elsewhere in the fisheries CEA study area also would not adversely affect fish. CRC noted that the available studies suggested rainbow trout were largely unaffected by forestry operations and brook trout appeared to be expanding their range throughout the upper McLeod River basin. CRC concluded that it was unlikely that the forest industry would have any adverse effects, cumulative or otherwise, on future fish populations or habitat within the study area.

With respect to the oil and gas industry, CRC concluded that the potential effects on fish populations would be similar to those of the forest industry. CRC noted that there had been no documentation of fish populations in the area being affected by the petroleum industry. The company indicated that current operating procedures for the petroleum industry had become sufficiently stringent so that any potential adverse effects would be effectively mitigated.

CRC noted that the literature suggested that the primary sources of fisheries impacts from both forestry and the oil and gas industry were generally associated with linear developments (roads and pipelines). CRC assessed the potential effects of road construction as a result of both the oil and gas industry and the forest industry. CRC stated that its analysis of the available forestry and oil and gas data suggested that road density in the Cheviot mine CEA area would increase to approximately 0.91 km/km^2. Based on the data from the Tri-Creeks experimental watershed studies, CRC stated that it appeared that road densities of 0.6 to 1.0 km/km^2 would not have adverse effects on fish populations. CRC concluded that cumulative adverse effects due to road construction would not be viewed as immediate, but it noted that the monitoring and ongoing evaluation of linear developments should be considered.

CRC noted that it had also considered the risks of overharvesting of fish due to a combination of increased numbers of recreational users and increased access due to forestry and oil and gas development. Based on provincial angling licence sales, CRC observed that angler use in the fisheries CEA study area likely could be expected to continue to be relatively stable. CRC also

noted that increased access would only result in increased harvest for 5 of the 35 fish-bearing streams in the area. Due to the regulations on legal harvest size, this harvest increase should have little effect on the total population in any of these streams. CRC also stated that the Alberta Fisheries Regulations could be used to address the potential effects of access development on fish populations. Therefore, the means to mitigate the potential effects of overharvesting due to access development were available if needed.

CRC observed that the development of mitigation to reduce or eliminate the adverse effects of industrial activities on the fisheries resource would be an ongoing process. Subsequent to the original application, CRC stated that it had implemented various follow-up and monitoring programs for fisheries in the study area. CRC stated that it intended to monitor other end-pit lakes at the Luscar mine site, establish a stream flow monitoring program in the McLeod River and Mckenzie Creek, and develop a program to monitor bull trout spawning in Mckenzie Creek. CRC noted that it had also commissioned an assessment of in-stream habitat enhancement opportunities in the upper McLeod River, implemented a fish population monitoring program in the main stem of the upper McLeod River, and planned to develop fish ponds and overwintering capabilities in areas where fish would be introduced to the system.

In response to questioning by TUC as to why a different approach was adopted for the aquatic CEA relative to the terrestrial assessment, CRC stated that the methods were established on a VEC-by-VEC basis, as in the 1996 CEA. In response to TUC's suggestion that the area used for the terrestrial CEA might be appropriate for fish, CRC agreed that a region of that size could have been used. However, CRC noted that the area would have to be defined in terms of the fisheries resource. CRC also indicated that if a CEA for fisheries were done for an area that size, it would require significant amounts of cooperative data-gathering by various stakeholders in the region. CRC recommended the Foothills Model Forest Program as a good vehicle for such work if it were to be done.

The Panel also questioned CRC as to why the aquatic CEA did not address annual mortality rates for fish populations in the Cheviot Project, as was done in the terrestrial analysis for grizzly bears. CRC responded that although the bear approach looked very sophisticated, it was still a modelling approach and was largely theoretical, whereas the aquatic CEA used empirical data. This, the company believed, provided a better estimate of likely cumulative effects.

With regard to a recommendation by TUC that CRC use a species-specific approach, focusing on bull trout and Athabasca rainbow trout, rather than the entire regional fish population, CRC responded that the use of single species such as these would not have been appropriate. While both species are regionally important, their low numbers would have made obtaining reliable population estimates difficult. Furthermore, the selection of those two species over others implied value judgements regarding relative importance that CRC was not prepared to make.

With regard to concerns raised about bull trout and their potential extirpation from the Cheviot mine area, CRC observed that since the zero harvest regulations were put in place, bull trout numbers had increased over their range. CRC also indicated that it had performed radio telemetry studies in the region of the proposed mine that had led to the identification of the bull trout

spawning area on upper Mckenzie Creek. Since this was the only known spawning site in the region, CRC noted that it had done a detailed evaluation of the potential for mining to affect the site and had put a plan into place to ensure that this site was protected.

TUC also expressed concerns that the increase in brook trout populations in the area may have had an adverse effect on the native rainbow and bull trout. In response, CRC noted that there was no evidence of any adverse effects on rainbow trout. The company also indicated that any effects on bull trout might also have been significantly influenced by years of overharvesting. With the provincewide protection of bull trout, CRC indicated that their population numbers in the region might now begin to increase. CRC also observed that the non-native brook trout were not as heavily protected as bull trout, and this would positively influence the native species in the system.

At the hearing, CRC was questioned by TUC as to the effects of sediment on fish. TUC quoted from the assessment in the original application, which stated that "Sediment input to streams may constitute the most significant potential effect on fisheries resources in the basin, but the extent and the positive or negative effects of sediments on the range of fish communities and habitats in the McLeod River have not been addressed" (CRC Application, 1996, Vol. II, p. C-82). CRC stated that it did not accept TUC's contention that the CEA failed to consider the linkage between increased sediment yield and impacts on fish. The applicant stated that the aquatic VECs were clearly linked to the fish population VEC.

7.1.2 Views of the Interveners

In its submission, TUC expressed a number of concerns regarding CRC's aquatic CEA. In addition to concerns regarding the use of different spatial and temporal scopes and the different treatments of other sources of impact, as discussed previously, TUC believed that the report contained other inconsistencies. TUC argued that CRC's practice of eliminating project impacts deemed to be insignificant from consideration in the CEA was wrong, noting that a series of insignificant effects could combine to create a significant effect. The sum total of disturbances needed to be looked at prior to the determination of significance, TUC said. TUC used the fisheries CEA provided by CRC as an example of where, in its view, CRC had inappropriately concluded that in the absence of evidence of recent adverse effects in the study area, there could be no significant effects.

TUC indicated that a species-specific approach, using native bull trout and Athabasca rainbow trout as VECs, would also have been more appropriate than CRC's use of regional fish populations. TUC felt that due to the general emphasis on overall fish populations, the potential implications of the already observed changes in fish community structure were not adequately considered, particularly the expansion of non-native fish in the upper McLeod River. TUC also felt that in its analysis CRC should not have used total fish density as the sole indicator to assess effects on the regional fish populations. TUC indicated that substantial year-to-year variability in populations would have made it difficult to conclusively differentiate disturbance-related changes from other sources of variability. TUC felt that CRC should have included indicators such as size

and age structure, community composition, spatial structure, distribution, connectivity, and productivity when assessing effects on regional fish populations.

TUC undertook a detailed re-evaluation of the data presented by CRC. In its re-evaluation, TUC indicated that in its view non-native brook trout had replaced native rainbow trout as the numerically dominant species in the existing mining area. TUC noted that this species shift did not appear to be occurring elsewhere in the study area. As a result, it concluded that the fisheries data from the Coal Branch streams provided by CRC were not representative of the upper McLeod River cumulative effects study area and could therefore not be used to reach conclusions regarding the cumulative effects on regional fish populations.

TUC also expressed concern over possible adverse effects on native fish populations as a result of the introduction of non-native fish. It was particularly concerned over the increase in brook trout numbers and the potential for displacement of or hybridization with native rainbow trout or bull trout. TUC questioned the ability of the bull trout populations to tolerate additional harvest pressures, given the increasing brook trout populations. Finally, TUC felt that the expansion of non-native species was generally regarded as a sign of a stressed native fisheries, rather than a sign of a healthy fishery. The brook trout expansion should be considered to be an adverse effect on regional fish populations, it said, because it is inconsistent with the Coal Branch IRP.

With respect to forestry, TUC noted that there had been a documented expansion of non-native brook trout in the upper McLeod River study area following forest harvest. TUC also noted that forestry and other existing activities had been documented to cause movement barriers for fish in the McLeod watershed. TUC indicated that these barriers could have adverse effects on the seasonal or year-round distribution of fish species, which might not have been reflected in fish density data from long-term monitoring.

With respect to CRC's compensation plan, TUC indicated that mining and end-pit lakes also favoured the expansion of non-native brook trout populations and the decrease in native trout populations. TUC believed that the studies provided by CRC revealed that end-pit lakes had been contributing to increased stream temperatures in their outlet streams. TUC noted that there was a growing body of scientific literature that suggested brook trout would out-compete bull trout at higher stream temperatures. Due to the numerous end-pit lakes proposed, TUC was concerned with potential cumulative effects on water temperatures in both the McLeod and Gregg River watersheds. It felt that until the cumulative effects of end-pit lakes were better understood or alternative compensation measures were identified, further authorizations for end-pit lakes should not be permitted.

TUC stated that in its view the aquatic CEA assumed that all future environmental protection measures would be successful but did not believe that this claim was substantiated. TUC proposed a different scenario regarding the success of mitigative measures that it believed was more realistic. Based on the available literature and experience in the eastern slopes, TUC stated that even with the implementation of standard environmental protection measures, short-term effects would occur at all sources of disturbance and long-term chronic effects would continue at a smaller number of sites. TUC thought that these minor but additive sources of disturbance

would contribute to significant cumulative environmental effects on native fish. As a result, TUC felt that CRC had underestimated potential cumulative effects on native fish species in the McLeod River watershed.

TUC undertook an assessment of the potential effects of future activities in the upper McLeod River using data provided by CRC at the hearings. Its estimates suggested that planned and likely forestry and oil and gas activities would result in a 17 to 72 per cent indirect loss of riparian (stream bank) habitat, increased barriers to fish movement, and elevated sediment yields in the grizzly bear CEA study area. TUC also believed that predicted future road densities found in BMUs 3A, 3B, and 3C exceeded a threshold at which long-term effects on bull trout populations have been documented. Estimated road crossing densities were in the medium to high hazard range, indicating that detailed site-specific assessments were warranted. TUC also found that predicted sediment yields from road crossings alone would continue to increase beyond natural levels over the next 25 years. TUC concluded that regional fish populations would face cumulative risk beyond the conditions that currently existed from road construction, eutrophication, competition, and hybridization with introduced fish species and sediment input.

TUC provided the Panel with a number of conclusions and recommendations. It recommended that strong consideration be given to protecting the fluvial habitat of Mckenzie Creek and Redcap Creek, as they support important fish species. It did agree that CRC's proposal to introduce native Athabasca Rainbow trout into the upper McLeod River was an appropriate mitigation measure. TUC did not believe, however, that the end-pit lakes would adequately compensate for the loss of stream habitat. It believed that the applicant's compensation program should be designed to comply with the Coal Branch IRP objective of maintaining and enhancing native fish populations and should consider the merits of programs that suppress or eradicate non-native fish.

TUC also believed that CRC should adopt a number of measures to reduce the degree of harmful alteration, disruption, and destruction of fish habitat. This included the creation of overwintering pools and other habitat, maintenance of winter flows in streams, and the production of an annual public report on the Project's net effects on fish and fish habitat, among other suggestions.

TUC recommended that a cooperative regional research and management group be created to help develop and implement aquatic monitoring, research, and management programs in the McLeod and Cardinal River watersheds. It recommended that this group include federal, provincial, and municipal governments, industry, and other stakeholders, such as TUC. TUC indicated that the group's focus should be on increasing the understanding and ability to manage cumulative effects on native fish populations and water quality in the McLeod River basin. In response to questioning by the Panel, TUC added that this group could possibly be created as a subcommittee of the Foothills Model Forest Program.

TUC also expressed concern regarding the potential eutrophication of the McLeod River watershed as a result of the cumulative inputs of nitrates and phosphorus from mining and logging operations respectively. Furthermore, TUC noted that Lac Des Roches was being

drained, which would terminate the long-term studies on lake aquatics conducted by CRC on that lake.

AENV stated that it accepted CRC's analysis of the impacts of the Project on surface water quantity, but it expected CRC's proposed mitigation plan to be able to address the potential effects of end-pit lake filling during periods of low flows. It believed that the actual impacts on mean annual water yield attributed to forestry would, in fact, be less than CRC predicted. AENV did accept CRC's conclusion that the Project should not significantly contribute to negative cumulative impacts on water quality as a result of sediment levels, provided that proper sediment control was implemented. Long-term monitoring programs would, however, be essential to verify CRC's conclusions.

AENV noted that it concurred with TUC that the Tri-Creeks watershed study cited by CRC in the CEA was inconclusive with regard to the influence of forest harvesting on sedimentation because of the occurrence of a flood that masked these effects. AENV noted that specific research at Tri-Creeks showed that a small increase in sedimentation resulted in large increases in fish embryo mortality; yet population effects were not observed.

With regard to the risks of adverse impacts due to nitrogen loading, AENV expressed similar concerns to TUC regarding cumulative nutrient inputs. AENV believed that there was potential for increased human activity in the basin resulting in increased phosphorus levels, which in combination with nitrogen inputs could be of concern. It was noted that even low levels of phosphorus could be enough for significant growth of aquatic plants. AENV stated that there was potential for nutrient inputs in the headwaters to combine with nutrient inputs farther downstream and contribute to problems of overenrichment in the lower river. AENV observed that complaints had been received previously about excessive growth of aquatic plants in the lower reaches of the McLeod River.

AENV expressed uncertainty regarding CRC's conclusions that the impact of the Project on water quality was a minor long-term regional reversible effect and that nitrate release from all mining activities within the study area would not adversely affect water quality or enhance eutrophication. AENV stated that nutrient control was a general concern in northern rivers and noted that a previous study had recommended that nutrient discharges to the northern rivers be substantially reduced. In its submission and at the hearing, AENV committed to collaboration with CRC and other stakeholders to implement a long-term monitoring program and to develop strategies to manage the effects of eutrophication.

With respect to fisheries, AENV felt that the population densities described by CRC in the CEA tended to be lower, based on the Tri-Creeks study, than what it might have expected. AENV felt that these low densities and the limited number of data points may have resulted in a false assumption that the current land uses have no effects on fish populations. AENV also believed, however, that the monitoring programs developed during the approval process would provide better baseline data prior to the commencement of mining. AENV also noted that further restrictions on angling in the Mckenzie Creek and upper McLeod River watershed were proposed to commence on April 1, 2000.

AENV said that some uncertainty still remained regarding the CEA of fisheries. AENV also stated, however, that the regulatory provisions already in place, including the end-pit lake working group, provided a framework in which to gather further baseline data and develop the specific research needed for the protection of fish and fish habitat. AENV concluded that it was prepared to accept the replacement of stream habitat with self-sustaining end-pit lakes, provided that they met specific criteria.

On the matter of nitrogen loadings, Natural Resources Canada (NRCan) stated that it concurred with CRC's conclusion that elevated nitrate in the McLeod River system resulting from drainage from the Cheviot mine would not be significant. It believed that CRC's predictions of nitrate levels as a result of mining activity were very conservative. NRCan stated that even if nitrate levels greatly exceeded the 1 mg/L surface water quality standard, eutrophication would not occur due to the absence of phosphorus. NRCan noted that eutrophication was only an issue below the town of Edson where sewage effluent was discharged into the McLeod River. NRCan perceived this to be an urbanization issue totally unrelated to upstream mining activity.

Treaty 8 First Nations of Alberta (Treaty 8 FN) provided a written submission to the Panel prior to the March 2000 hearings but did not provide any evidence in support of its environmentally related concerns at the hearing. In its written submission Treaty 8 FN stated that it believed that the impact of the Cheviot mine on First Nations was not adequately addressed in CRC's reports. With regard to aquatic issues, Treaty 8 FN expressed strong concern about the potential elevated nitrogen concentrations resulting from blasting chemicals. Treaty 8 FN stated that it did not agree with NRCan that the eutrophication potential was primarily of municipal concern and stated that consideration of the combined effects of mining and the town's contribution of nutrients was clearly of concern with respect to cumulative effects. Treaty 8 FN suggested that nitrogen concentrations well below the provincial standard of 1 mg/L could cause adverse environmental impacts if phosphorus was present. It noted that previous studies had demonstrated eutrophication effects in the presence of low levels of phosphorus and the subsequent effects of this impact on other aquatic organisms. Treaty 8 FN believed that a more thorough CEA should have considered that information. Three years of study in the area would be required to ensure a reliable assessment, it said.

Treaty 8 FN also expressed concern over the impacts of the Project on fisheries resources. It noted that some of the small streams that the Cheviot mine would affect were key spawning areas for the McLeod system. Treaty 8 FN pointed out that the Cheviot Project would affect several fish species, including the bull trout, a species it viewed as an integral part of the aquatic ecosystem. Treaty 8 FN indicated that the fisheries were an important food source for the First Nations and any effects on the resource could in turn negatively impact the health of its members.

The AFN believed that the main impacts associated with the Project had been accurately predicted and described, with suitable mitigation strategies prepared. Specific concerns raised by the AFN related to water quality included increases in sediment loading and increases of in-stream concentrations of nitrogen, heavy metals, sulphides, and phosphorus. However, it

believed that the mitigation measures proposed by CRC would successfully minimize the impacts of the Project on water quality.

The AFN did believe that more information was required in a number of areas related to aquatics to facilitate the environmental assessment. This included the potential for sediment generation from upgrading the mine access road and the subsequent effects on water quality, as well as a plan for the abandonment and removal of the Harris Creek reservoir. Also included were the impacts on, mitigation of, and compensation for bull trout; fish salvage and transfer plans during the development stages of stream diversion; and a plan to address the issue of access and its subsequent effect on the fisheries resource. The AFN also noted that disposal plans for the sludges generated by the sedimentation and treatment ponds were not found in their reviews of the CEA. The AFN made a number of recommendations regarding aquatic resources that it believed might be appropriate for the permitting processes of AENV and the EUB.

At the hearings, DFO indicated that with a phased development schedule, including sequential approvals for various phases of the Project in combination with the implementation of appropriate monitoring programs and the commitment of CRC to practise adaptive management, the potential cumulative impacts of the Project on fish and fish habitat could be addressed.

7.1.3 Views of the Panel's Consultant

In his original evaluation of the documents produced by CRC, Dr. Ross believed that the CEA on water quantity and sediment was inadequate. He believed that while the forestry impacts dominated this section of the CEA, the basis for determining these impacts was not stated, nor were the impacts reported. He noted that the conclusions drawn from the CEA were not necessarily incorrect but that the reporting of the methods and results was not explicit enough to evaluate the validity of the conclusions. Dr. Ross noted that the CEA for nitrogen would be considered adequate if the assumptions regarding forestry were correct.

At the hearing, Dr. Ross also advised the Panel that the information gaps could be easily remedied, but he noted that the information was necessary to adequately assess cumulative effects. However, the level of forestry activity was not explicit in the assessment. As a result, he expressed uncertainty about the assumptions upon which the conclusions were based. Subsequent to the submission of additional information by CRC in response to his assessment, Dr. Ross indicated that several of his concerns had now been fully addressed. He indicated that the treatment of recreation and oil and gas activities for water quality sediment and nitrogen were explained to his satisfaction. He did, however, question the effects on the fisheries VEC should a potential growth in recreational fishing occur. It was not clear to him whether such an assumption was built into the analysis.

7.1.4 Views of the Panel

With regard to surface water quantity, the Panel concludes that CRC's CEA has effectively incorporated the impacts of the proposed Cheviot Project, other mining projects in the area, forestry operations, oil and gas development, and the upgrading of Highway 40. The Panel

concludes that there will be no significant cumulative adverse effects on surface water flow, but that some minor localized negative effects may occur with respect to short-term peak flow and annual flows. The Panel also reconfirms its previous requirements that CRC's water control designs include the management of storm flows and that it fill end-pit lakes in such a way as to avoid negatively affecting low flows.

With regard to the impacts of sediment on water quality VEC, the Panel continues to expect that a large surface mine will generate numerous sources of sediment. In its earlier report, the Panel concluded that this was an ongoing concern if not properly managed, and the Panel continues to hold that view. The Panel also notes, however, that this is a common issue at all surface mines and that there are a number of technologies and management plans in place that allow for the effective control of sediment. Therefore, the Panel continues to believe that the impacts from sediment can be prevented through sound sediment control measures.

Notwithstanding these measures, it is likely that some sediment loading from the Project will occur. Therefore, the Panel notes and supports AENV's requirements for long-term monitoring of sediment loading and any associated bio-monitoring necessary to ensure that the aquatic environment is protected. These provincial programs should effectively monitor any change in the aquatic ecosystem and ensure that effective mitigation can be carried out.

With regard to the cumulative effects from sediment, the Panel notes that CRC identified a possible adverse cumulative effect if both forestry and oil and gas activities were to occur concurrently with the construction of the road and rail to Cheviot and with a storm event. The Panel will require that CRC, through its EUB approval, ensure that its road and rail construction activities are coordinated with regional forestry and oil and gas activities to reduce the risks of this occurring to acceptable levels. The Panel also notes CRC's commitment to work with other stakeholders to implement regional industrywide operating guidelines for sound sediment control measures focused on activities such as road construction. The Panel believes that this initiative will further reduce the future risk of cumulative adverse effects from sediment generated by regional industrial development and, through the EUB, is also prepared to support such an initiative.

With respect to nutrient loading, the Panel notes that CRC chose to focus its CEA on nitrogen, and more specifically nitrate, as the basis for assessing the risks of eutrophication. In reviewing the evidence provided by CRC, the Panel concludes that this is a reasonable approach and that CRC's predictions of regional nitrogen loading, including the potential effects from other sources, are also reasonable. As is the case for all of the environmental issues addressed in this report, the Panel does accept that there is an element of uncertainty with regard to these predictions. However, the Panel concludes that the approach taken to determine future loadings was sufficiently conservative that these uncertainties, even if they do occur, will not cause any short-term adverse effects and can be addressed through a number of longer-term mitigation programs. The Panel also expects that the nitrogen levels, even at maximum input, would still generally be below the Alberta Surface Water Quality Guidelines.

The Panel notes that CRC's studies indicated that phosphorus, rather than nitrogen, is likely the limiting nutrient for potential eutrophication within the study area. In its report to the Panel, CRC also indicated that although phosphorus levels were not currently of concern in the region of the Cheviot Project, there was a possibility of future forestry activities and increased human activity resulting in increased phosphorus loadings. AENV also expressed concerns that these possible sources of phosphorus, in combination with nitrogen inputs, could potentially contribute to eutrophication of the system. Finally, it is clear that the Town of Edson does contribute measurable levels of both nitrogen and phosphorus through its sewage outfall and that nutrient loading downstream from the town has been an issue in the past. Forestry operations and agriculture may also be sources of phosphorus. Therefore, while there is no clear evidence at this time that eutrophication in the McLeod River system is or will be a significant issue, the Panel concludes that there is a potential that this could be an issue in the future unless properly managed.

The Panel notes AENV's commitment to collaborate with CRC and other stakeholders to implement a long-term monitoring program to develop strategies to manage the effects of eutrophication. The Panel accepts as reasonable the contention that the cumulative effects of nitrogen loading from Cheviot and other likely developments in the vicinity, based on available data, will be insignificant within the CEA boundaries. However, the Panel also accepts CRC's commitment to play an active role in the management program proposed by AENV, focusing on the amount of nutrients entering the system and methods to reduce these levels. The Panel, through the EUB, will also recommend to AENV that the downstream communities be invited to participate in any program designed to manage nutrient loadings on a regional basis. Based on the above, the Panel concludes that no significant regional adverse effects on eutrophication will occur due to the development of the mine.

With respect to the fisheries VEC, the Panel notes that in its previous report it concluded that some adverse effects to fish and fish habitat would occur as a result of development of the proposed Cheviot Coal Project. The Panel also concluded that compensation for that loss could be achieved and would effectively mitigate these impacts. The Panel, after reviewing the evidence, continues to conclude that its earlier findings remain appropriate.

The Panel notes that TUC believes that greater emphasis should have been placed on native (e.g., bull trout) than on introduced fish stocks (e.g., brook trout). However, the Panel agrees with the applicant that this is a value judgement. In the absence of direction to the contrary from either the provincial or federal agencies mandated to protect fisheries, the Panel can only conclude that CRC's approach is consistent with public management objectives. The Panel does note that, notwithstanding its approach to estimating cumulative effects, CRC has committed to undertake programs designed specifically to enhance the opportunities for native fish species.

The Panel also concludes that neither forestry nor oil and gas development is likely to result in significant adverse effects, cumulative or otherwise, on fish populations within the study area. The Panel believes that the approach taken by CRC to assess the significance of the impacts is sufficiently conservative to ensure that meaningful effects have been identified.

The Panel does believe that, if not properly managed, road construction and other linear features resulting from the various forms of development into the region, including recreation, may cause cumulative effects in the future. However, the Panel has no reason to believe that improper management will occur. Furthermore, the Panel believes that the ultimate road densities associated with future development are not fixed and can be managed through appropriate planning by the province. The Panel notes that a number of regional environmental planning initiatives are now under way. Since establishing thresholds for the acceptable density of linear developments will clearly be important if unacceptable cumulative effects are to be avoided in the future, the Panel will expect CRC to bring this issue forward in the appropriate planning forum. The Panel will instruct EUB staff to actively participate in any such process to manage the development of linear facilities on a regional basis. The Panel will also require CRC, through its EUB approvals, to ensure that its development remains consistent with any thresholds eventually established.

With regard to the concerns raised by Treaty 8 FN regarding the potential for adverse effects from the Project on regional water quality and fisheries also resulting in an adverse effect on its members, the Panel notes that Treaty 8 FN chose not to provide any direct evidence regarding these issues. Notwithstanding this, the Panel has been able to conclude that no significant adverse effects on surface water quantity or water quality will occur within the CEA study region as a result of the project or other area activities. The Panel has also concluded that any local adverse effects on fisheries can be addressed through various compensation programs. Therefore, the Panel concludes that no significant adverse effects on members of Treaty 8 FN making use of the CEA study region will occur.

With regard to effects downstream of the CEA study area, the Panel concludes that there will be no significant cumulative adverse effects on downstream surface water quantity, water quality, or fisheries as a result of the Cheviot Coal Project and so no associated adverse effects on the lands, resources, or members of Treaty 8 FN.

The Panel does not completely agree with CRC's contention that increased access and associated angling pressure will have little effect on the total population of fish in the Project area. This result will only occur if the fisheries managers can adapt local regulations to accurately track changes in fishing pressures. However, the Panel is aware of the current harvest protection for native species in the study area and understands that these fisheries regulations have been designed to address the potential effects of overharvesting. Therefore, while the Panel believes that poorly controlled harvesting of fish may result in cumulative effects, the Panel concludes that the risk of this occurring is sufficiently low that the likelihood of adverse effects is insignificant.

The Panel notes CRC's commitment to develop fish ponds and overwintering capabilities where fish will be introduced to the system. The Panel is aware that CRC has established a stream-flow monitoring program in both the McLeod River and Mckenzie Creek, as well as a program to monitor bull trout spawning in Mckenzie Creek. The Panel is also aware of CRC's assessment of in-stream habitat enhancement opportunities in the upper McLeod River and its fish population

monitoring program in the main stem of the upper McLeod River. The Panel believes that these represent significant mitigation and monitoring commitments by the company.

The Panel notes CRC's commitment to monitor the end-pit lakes in order to establish whether mitigation and compensation goals have been achieved. The Panel expects CRC, as part of its monitoring program, to perform a study looking at the effects of end-pit lakes on outflow stream water temperatures and any resulting negative effects on native fish species. The Panel will require CRC to use the necessary adaptive management techniques should studies indicate that end-pit lakes are causing currently unforeseen negative effects on native aquatic species in the area.

DFO commented that a phased development schedule, with sequential approvals, would help to ensure that the various mitigation measures proposed were successful. The Panel notes that the EUB has a substantive approval process for each new mining phase. The current application, to be acceptable, must contain sufficient information to allow, at a minimum, for the conceptual details of the eventual mine plan to be evaluated. If sufficient information is provided under the provincial process, a mine permit is issued by the EUB. AENV, in turn, takes the EUB mine permit into account when establishing its approvals for the proposed mine, including a Conservation and Reclamation (C&R) approval. The C&R approval establishes the long-term reclamation requirements for the mine, as well as setting out financial security requirements to ensure that the provincial reclamation goals are met. Next, the EUB regulatory process requires separate approvals for all significant components of a proposed coal mine (e.g., individual pits, rock dumps, retention ponds, etc.) before they can be developed. These are each subject to detailed technical review, including their effects on the environment, and can each also be subject to a full public hearing. Finally, the various AENV approvals are reviewed at routine intervals to ensure that they also remain relevant to the mine as it develops. Based on the above, the Panel concludes that Alberta's regulatory approval process for coal mines will be able to address DFO's concerns.

As noted above, the Panel concludes that cumulative adverse impacts to the aquatic VECs will be negligible to minor and that residual impacts can be successfully mitigated or addressed through compensation. **The Panel recommends that these conclusions be accepted by the federal government. The Panel also recommends that through the Foothills Model Forest Committee, DFO, in partnership with AENV, lead the formation of a cooperative regional research and management subcommittee to help develop and implement aquatic monitoring, research, and management programs in the McLeod and Cardinal River watersheds.** The members of the subcommittee should include regional agencies, industry, and other stakeholders, such as TUC. The Panel suggests that the group's focus should be on increasing the understanding and ability to manage cumulative effects on native fish populations and water quality. The Panel also would suggest that the committee consider whether there is a need to expand its analysis beyond the study area boundaries used by CRC in its CEA. **The Panel recommends that DFO actively participate in these and any other regional aquatic studies.**

The Panel notes that its terms of reference require that it consider "The Environmental Effects of the Cheviot Coal Project **including the Environmental Effects of malfunctions or accidents** [emphasis added] that may occur in connection with the Cheviot Coal Project...." The Panel also notes that it is expected to consider not only the environmental effects of the Project but also any change to the Project that may be caused by the environment.

These issues were addressed in the Panel's 1997 report. In that report the Panel concluded that the only reasonably foreseeable sources of accidental impacts from the Project on the environment were spills or the release of stored water and associated sediment into the McLeod River system from either the mine site or the coal plant. The Panel also concluded that one possible source of such a release was a significant rainstorm event. The Panel was unable to identify any other reasonably likely sources of environmental effects on the Project or of accidents or malfunctions that would have potentially significant adverse effects.

A significant release of either contaminants or sediment could have significant adverse effects on aquatic VECs and on species such as Harlequin ducks, which make use of riparian habitat. The Panel continues to be of the view, however, that the risk of these accidental events, including the risks associated with significant storms, has been adequately reduced by the various water management systems proposed for the mine site and concludes that the risk of adverse environmental effects is insignificant. **The Panel notes that these findings were not questioned by the federal court and recommends that they continue to be accepted by the federal government.**

7.2 Selenium

7.2.1 Views of the Applicant

With respect to selenium levels in fish, CRC indicated that it first became aware of a possible concern a few weeks prior to a February 29, 1999, news release by Alberta Health and Wellness (Alberta Health). The news release indicated that initial results of tests on fish taken from Lac Des Roches, West Jarvis Creek, Luscar Creek, and Gregg River showed possible high levels of selenium such that consumption of such fish could result in a daily selenium intake higher than accepted guidelines. CRC stated that it recognized this as a potentially serious concern and that it was investigating the issue.

CRC indicated that a selenium working group was formed in January 2000, consisting of CRC, Luscar, AENV, DFO, the EUB, and Smoky River Coal Limited. CRC noted that the group was established to develop an understanding of the sources of the selenium, what guidelines would be appropriate, and what impact selenium would have on fish and other aquatic species. The working group was to determine if there were any adverse environmental effects caused by the reported selenium levels or if there might be any adverse impacts expected in the future. Key study components of the working group would include assessing existing and potential impacts on biota; determining sources and mobilization mechanisms of selenium; evaluating existing selenium concentrations in water, sediment, and biota in the upper McLeod River, and investigating potential control and mitigation measures.

CRC agreed with AENV's view that the studies determining the need for a serious health advisory would take approximately three months. CRC indicated that the working group had already finalized two studies related to human health risks on selenium and these had been submitted to Alberta Health to assist in its review process. These reports indicated that there was little to no health risk to humans consuming fish harvested from the vicinity of the mine. CRC noted that even though the two human health risk assessments were done separately and been undertaken independently, both had come to similar conclusions.

CRC expected that the selenium working group would take 12 to 18 months to complete its studies. CRC stated that it felt reasonably confident the group would be able to identify the source of the selenium and deal with the process by which it was released. CRC also felt that the elevated selenium levels posed a negligible risk to the surrounding environment. It noted that all the evidence indicated that Lac Des Roches, the area with the highest measured concentrations of selenium, had continued to have self-sustaining populations of aquatic species. CRC's current studies indicated that there were no abnormalities found in adult aquatic species and the egg hatching of waterfowl, including Harlequin ducks, was also found to be normal.

Responding to questioning by the AWA Coalition, CRC stated that although it did not have a selenium CEA at this time, it also did not have any evidence to show that there was a selenium issue expected with the proposed Cheviot mine. CRC responded to the AWA Coalition's questions regarding whether mining was responsible for the increased selenium levels by stating that if mining were responsible for increased selenium levels, when mining ceased, so would any activity releasing selenium.

In response to a concern raised by the AFN over selenium levels in animals, CRC indicated that throughout the cumulative effects studies numerous animals were tested for selenium. Within the study area, blood samples were taken from grizzly bears that indicated selenium levels below levels considered toxic for livestock. Sheep in the area were also sampled, and the results indicated relatively high selenium levels, although there was no evidence that they were toxic. Harlequin ducks were also sampled, and all values were found to be below toxic levels.

7.2.2 Views of the Interveners

AENV noted that, subsequent to the previous hearings for the Cheviot Project, further data and information had been collected regarding selenium, particularly in the surface waters of the upper McLeod River and other rivers in the vicinity of the coal mines. The data collected indicated that selenium levels found in the Project area were relatively elevated and that some levels exceeded current water quality guidelines for the protection of aquatic life. AENV also found that elevated selenium concentrations in tissue and eggs of fish correlated with high levels of selenium in the water.

Due to the identification of increased selenium levels in the area, AENV indicated that further detailed assessment work was being done. It specified that through the selenium working group, both AENV and industry members would work to increase the level of monitoring. Due to the

uncertainties surrounding the issue, AENV noted that it was still unclear as to whether the elevated levels of selenium would be an issue for the Cheviot Project. It indicated that should the Cheviot Project be approved, the information obtained by the working group would be used to manage the development so as to control or mitigate any adverse effects associated with selenium.

A number of interveners expressed concern over the levels of selenium in surface waters. In response to questioning by the Cadomin Environmental Protection Association, AENV indicated that it would be maintaining water quality monitoring programs in the Cadomin area, including surface water testing. AENV also indicated that it would be possible to test some of the wells in Cadomin to ensure that levels of selenium were within the potable water guidelines of Alberta. AENV assured the community of Cadomin that selenium levels in the McLeod River adjacent to the town site were below guideline levels. AENV stated that management of the issue could be done at the licensing stages of approval should it become a problem.

TUC indicated that there was a need for further assessment of end-pit lakes with respect to selenium. It expressed concern over the eventual viability of the habitat compensation program, since it was intended to replace lost river habitat with lake habitat. Its main concern arose from the fact that problems with high selenium levels appear to occur in warm standing water rather than flowing water environments. TUC also indicated a concern regarding the susceptibility of rainbow trout and bull trout to selenium. Treaty 8 FN also was concerned with the effects of mining on the selenium levels in the McLeod River system.

In its intervention, the AWA Coalition questioned what the selenium levels would be like after mining operations were complete. It felt that both the Project-specific effects and cumulative effects regarding selenium should have been looked at, particularly the effects of other mines in the vicinity of the McLeod River system. The AWA Coalition indicated that the measures proposed for dealing with selenium were both hypothetical and highly speculative. It stated that it was still unknown if any economically or technically feasible mitigation measures were available to deal with the issue.

7.2.3 Views of the Panel

In considering the issue of selenium contamination, the Panel notes that this issue has only been identified as being of potential significance for a relatively short period of time. Despite this, it is clear that the applicant and the Alberta government have made considerable progress in assessing the potential short- and long-term risks. In considering whether the potential impacts from selenium discharges from the Cheviot Project are acceptable, the expert evidence provided to the Panel on this issue by CRC was very helpful. It does appear that the current water quality guidelines for selenium are particularly conservative and that even an exceedance of those guidelines does not mean that there has been or will be an adverse environmental impact. Certainly the evidence presented to the Panel suggests that the risk to the public is minimal. Nor is there any evidence of other sources of selenium or of any associated cumulative impacts from developments other than mining. The Panel also notes that while AENV indicated clearly that the

evidence of higher than expected selenium is of concern, there was a strong comfort level that the issue could be addressed and public health and safety protected.

Based on this evidence, the Panel concludes that it is reasonable to expect that selenium levels, while warranting ongoing monitoring and research, do not represent a significant risk of adverse impact on regional water quality. The Panel also concludes that, based on the evidence to date, there is negligible human health risk associated with consuming fish harvested from the vicinity of the mine. It is clear to the Panel that the provincial government and the applicant have recognized the issues around selenium and have taken a number of significant steps, not the least of which is the formation of the selenium working group, to address these. The Panel accepts as reasonable that within a year to 18 months the selenium working group will be able to identify the sources of selenium and will subsequently be able to deal with the process by which it is released. The Panel will require, as a condition of its provincial approval, that CRC use the information obtained by the selenium working group to adaptively manage the Project design, construction, and operation so as to control or mitigate any adverse effects associated with selenium. Since sequential approvals from the EUB are required, ensuring that this occurs will be straightforward.

The Panel agrees with TUC's contention that there is likely a need for further assessment of end-pit lakes with respect to selenium. The Panel also believes that there is sufficient time for CRC to complete its studies on the issue prior to the use of end-pit lakes at Cheviot. The Panel expects CRC to continue to monitor new end-pit lakes for selenium levels and to report to the EUB and AENV on any resulting effects on aquatic species.

The Panel is aware that AENV has played a large role in collecting and processing the available data regarding selenium and will play a large role in the monitoring and management of the issue through both the selenium working group and the licensing stages of approval. The Panel agrees with the position taken by AENV that it is still unclear as to whether the elevated levels of selenium are going to be an issue for the Cheviot Project. The Panel notes and accepts AENV's commitment to ensure that water quality monitoring programs, including surface water testing, are maintained, especially in the areas surrounding the Hamlet of Cadomin. The Panel also notes AENV's commitment to administer water testing at selected wells in Cadomin to ensure that the levels of selenium remain within the Alberta potable water quality standards. **The Panel recommends that DFO continue to participate in the selenium working group in order to ensure that any federal requirements continue to be met.**

7.3 Terrestrial VECs

CRC identified five terrestrial VECs for consideration in the 1999 CEA. In CRC's view, the VECs selected represented the key regional issues relative to the proposed Project. The selected VECs were

- vegetation and botanical resources,
- elk,
- selected bird species,
- Harlequin ducks, and

- grizzly bears.

One or more indicators were associated with each VEC. CRC found no significant adverse cumulative effects for any of the terrestrial VECs studied in the 1999 CEA after mitigation measures had been taken into account. In general, CRC stated that conclusions reached in 1999 had a greater degree of confidence and certainty associated with them than the evidence considered in 1997 due to the assessment of added information.

At the hearing, CRC provided additional information (Exhibit 285) in response to concerns raised by the Panel's consultant, Dr. Ross. That exhibit was intended to identify the sources and types of information used by CRC to assess impacts to the various terrestrial VECS.

7.3.1 Views of the Applicant

Vegetation and Botanical Resources

In the 1999 Cheviot CEA, CRC defined the vegetation and botanical resources VEC as consisting of old-growth Engelmann spruce-subalpine fir stands, general vegetation composition and abundance, and valued plant species that occur within the Cheviot mine disturbance zone.

CRC stated that the additional information available for the 1999 CEA, compared to the 1996 assessment, resulted in the cumulative effect on general vegetation being downgraded to minor, with no significant cumulative effect expected. With appropriate mitigation and reclamation, loss of vegetation was considered by CRC to be short term, reversible, and within the range of natural variability caused by events such as fire. The potential loss of 29 ha of old-growth Engelmann spruce-subalpine forest vegetation in the Powerhouse Creek area was also downgraded from a major regional to a minor local impact, based on data showing that old-growth forests were generally more abundant and secure than previously thought. In addition, CRC found that the number of valued plant species within the Cheviot mine disturbance zone was lower than in the original assessment because the rarity status of some of the species had changed and two species had been transplanted. Furthermore, the Prospect Mountain alpine portion of the mine, which contained a relatively large proportion of valued plant species, no longer formed part of the proposed development area as a result of an earlier decision by the Panel under its provincial EUB mandate.

CRC stated that the vegetation and botanical resources CEA was undertaken for a 3040 km^2 study area (Figure 5). CRC explained that it chose this study area in part because the most comprehensive ecological classification was available for the area. The period from 1996 to 2025 was used as the temporal boundary for the analysis.

CRC stated that it based the vegetation and botanical resources CEA on two data sources. One was an ecosection level land classification developed for use in the regional grizzly bear and elk habitat assessments. This mapping and classification system included estimates of abundance of broadly defined types of plant communities. The second data set, which incorporated an Alberta Vegetation Inventory (AVI) data source, was provided by Weldwood and Sundance Forest Industries. AVI data primarily dealt with the structure and composition of the tree layer, while

the ecological land classification dealt with plant communities and understory species. These data summarized the forest cover type and amount of anticipated forest harvesting that would occur between 1996 and 2025.

CRC described how pre-existing disturbance features within the study area, such as forestry cut-blocks and mined areas, had implications with respect to the projected amount of mature vegetation cover within the study region, even though those disturbances did not occur within the temporal boundary of the CEA. CRC stated that it had also recognized the potential for future natural events such as wildfires or cyclic variation in regional climatic conditions to have a major impact on vegetation in the CEA study area during the time period considered; however, given their unpredictability, they were not included in the analysis.

CRC noted that the CEA analysis was limited to effects of the proposed Cheviot mine, likely forestry harvesting activities, and other potential mine developments. Linear disturbances associated with oil and gas (e.g., exploration roads, seismic lines) were not included. CRC explained that this was because they made up a relatively small amount of the overall area (0.9 per cent or less) and there was a lack of specific vegetation disturbance information available.

CRC clarified during the hearing that recreation was also assumed to have no significant cumulative impact on vegetation and botanical resources because such activities were either very site specific (e.g., campgrounds) or widespread (e.g., OHV use). CRC noted that exceptions to the above would occur if recreational activities incorporated the intentional use of sensitive vegetation or valued plant species into their activities or if recreation-related activities resulted in a major disturbance, such as fire.

CRC noted that an intensive botanical survey for the entire Cheviot CEA vegetation study area was not possible. Therefore the potential cumulative effects of developments on valued plant species within the Cheviot CEA area were based in part on a review of habitat requirements and associations by species. In response to questions, CRC confirmed that predicting species occurrences from habitat was difficult and depended on the habitat-specificity of the species. CRC stated that the valued plant species identified for the Cheviot mine disturbance zone had relatively specific habitat requirements, both in terms of climate and site conditions.

CRC stated that when assessing the significance of the potential impacts on vegetation and botanical resources it had included the various mitigation strategies outlined in its earlier application and accepted previously by the Panel. These included minimizing clearing, particularly in old-growth areas, revegetating using native species and, where practical, locating and transplanting rare species.

CRC concluded that a cumulative loss or modification of existing mature vegetation within the CEA study area would occur. Within the subalpine region, about 8.7 per cent (114 km^2) of the existing mature vegetation would be lost or modified as a result of overall resource development between 1996 and 2025. About 1.2 per cent (29 ha) of old-growth Engelmann spruce-subalpine fir forest would be lost. No cumulative impacts to valued plant species were expected.

Elk

CRC reported minor long-term regional positive effects on forage and negative effects on cover for elk. These effects were not considered significant after mitigation measures were taken into account. A minor adverse local effect continued to be expected as a result of vehicle collisions. CRC reported that the additional information available for the 1999 assessment gave a more specific direction on the expected outcome of the CEA and also provided additional spatial and nonspatial information for use in the CEA.

CRC reported that elk were chosen as a VEC for the 1996 CEA for several reasons, including their significance within the Coal Branch Sub-Regional IRP and the diversity of landscape features acceptable as habitat for elk. CRC noted that elk were more abundant in the region historically and tended to occupy areas that overlapped areas of human activity. In addition, elk are an important prey species for large carnivores, such as grizzly bears and wolves.

CRC stated that its 1999 CEA for elk was based on information assembled for the original Project application, complemented with more current information on elk where available. The elk CEA study area boundaries (Figure 5) included the area occupied by the population to be affected by development activity and by the adjacent populations. Boundaries were established with consideration given to the resident status of elk in the Cheviot Project area and the interchange of elk between the Cheviot Project area and the McLeod River corridor. The opportunities for interchange between elk in the Project area and Jasper National Park were also considered. CRC adopted the ecological and disturbance conditions as of fall 1999 as the baseline for the assessment. Past conditions were simulated by removing the footprint of all developments from the current ecological condition. Future effects were determined as of 2025, when mining was projected to be completed at the proposed Cheviot Project. The future scenario included effects both with and without the Project.

CRC noted that there were no established thresholds at which disturbance, loss of habitat, or other environmental pressures were known to affect elk productivity or cause elk to leave an area. In CRC's view, however, following Project development, future elk habitat effectiveness levels and habitat supply would be generally high. Overall, without the proposed Project, summer and winter elk forage was expected to decrease over time, while summer and winter cover was expected to increase. If the mine was developed, summer and winter forage was expected to increase, while summer and winter cover was expected to decrease.

In addition to re-evaluating the impacts of the Project on elk, CRC evaluated the potential for cumulative effects of future mining, forest harvesting, oil and gas, and recreational development. CRC noted that spatially explicit information was not available in every case to conduct a thorough quantitative analysis.

Forest harvesting and oil and gas development, CRC said, were expected on the eastern boundary of the Cheviot elk CEA study area. Changes in recreation use observed between 1995 and 1999 and projected to 2025 were also incorporated into the quantitative elk CEA. Most of the future effects involved changes at specific campgrounds as a result of the proposed Cheviot mine

development or forest harvest activities. CRC said that undisturbed habitat would absorb elk temporarily displaced by the mine until reclamation made new habitat available. The elk population would expand during active mining, once large areas were reclaimed and new forage was made available. CRC anticipated that trees would provide security cover for elk on the mine site 40 to 60 years after reclamation. Therefore, the cumulative impacts of the Cheviot mine development on elk after mitigation were determined to be insignificant.

CRC noted that the other industrial activities assessed in the CEA were also subject to government regulation and that they also employed mitigation practices for wildlife. Those factors were expected to further reduce regional cumulative environmental effects that the Cheviot elk population might experience in other parts of its range. CRC noted Weldwood's development of an access management plan for a portion of the Cheviot CEA study area and stated that such tools, along with CRC's own commitment to work with the government, would reduce any cumulative effect industrial development might otherwise have on wildlife. With regard to recreational impacts, the applicant noted that the Whitehorse Wildland Park and Coal Branch Forest Land Use Zone were models for the regulation of local recreation activity. CRC concluded that successful mitigation of impacts due to forest harvesting and other industrial activity in the Cheviot elk CEA, accompanied by implementation and enforcement of resource management plans, would prevent significant negative cumulative effects. Any residual effects were expected to be of minor magnitude. CRC added that as new spatially explicit information became available, periodic reassessment of elk habitat effectiveness might be warranted.

CRC described the specific mitigation it continued to believe was required to limit the impacts of the mine on elk and other wildlife populations. These included minimizing the disturbance of existing habitat where possible during mining, identifying wildlife habitat as a primary end land-use objective, and reviewing reclamation techniques appropriate for elk. CRC said it remained committed to using reclamation techniques that create wildlife habitat by mimicking the natural disturbance regime where possible. It also said that elk abundance and distribution would be systematically monitored to document their response to the mine site reclamation. CRC proposed that road mortality should be documented in the form of a mortality database and that slowdown zones should be implemented based on the evaluation of monitoring results. However, the company could only affect reduced speeds on roads under its control.

On a regional scale, CRC noted that successful mitigation of the potential impacts on elk would rely in part on the mitigation plans of other industrial developments. CRC stated that increasing recreation use in the region would also need to be accompanied by implementation of land and resource management plans, and provincial land management agencies would need to periodically monitor elk populations in parts of the Coal Branch. CRC said it was already working with AENV to coordinate its elk surveys in the Cheviot area with broader government surveys.

Selected Bird Species

CRC stated that it had based its 1999 CEA for selected bird species on information assembled for the original Project application in 1996. For the 1999 CEA, CRC focused on 12 selected bird species that either appeared on the federal endangered species list published by the Committee on

the Status of Endangered Wildlife in Canada or were listed as Red, Blue, or Yellow by AENV. CRC stated that the decision to focus exclusively on imperiled species was in response to concerns raised at the 1997 Cheviot hearing that human activity was contributing to overall population declines and ultimately contributing to the loss of biodiversity.

Of the 12 species examined in 1999, the Harlequin duck, golden eagle, pileated woodpecker, American dipper, and golden crowned sparrow were not considered neotropical migrants by definition. However, they were chosen to be included in the assessment because of their provincial status. Four species (osprey, golden eagle, prairie/peregrine falcon, and pileated woodpecker) were not known to breed in the Cheviot Project area.

The assessment of impacts to birds was conducted for an area roughly corresponding to the 895 km^2 elk CEA study area (Figure 5) and encompassing the mine lease and adjacent lands. In the case of impacts mediated by changes in vegetation, reference was also made to the larger (3040 km^2) study area employed in the vegetation assessment (Figure 5).

Potential sources of cumulative impacts considered in the assessment of the selected bird species VEC were other reasonably foreseeable mining activities and forestry. Oil and gas activity was generally located outside the CEA study area and therefore was not expected to contribute to the cumulative effects on selected bird species. CRC stated that the selected bird species CEA assumed that a 5 to 10 per cent annual increase in recreation had occurred in the last few years and increases were expected to continue, but at lower levels.

CRC predicted that the northern harrier, cordilleran flycatcher, brown creeper, clay-coloured sparrow, and Brewer's sparrow were all likely to lose some breeding habitat as a result of human activity within the Cheviot bird CEA area. The American dipper would lose two nest locations on the McLeod River, and the Golden eagle could experience an increased risk of vehicle collision mortality due to the proposed upgrading of the Grave Flats Road. Osprey, golden eagle, falcons, and the pileated woodpecker would probably also distribute themselves differently within the CEA study area as a result of the proposed Cheviot mine, but would continue to move through or visit the permit area. The golden crowned sparrow was not expected to lose habitat as a result of the mine permit. Vegetation loss or modification within the Cheviot CEA was thought to be within the range of natural variation. This conclusion was utilized in determining the regional effects of vegetation loss on the selected bird species VEC.

CRC confirmed that it was still proposing several mitigation measures raised during the 1997 proceedings to deal with the anticipated negative cumulative impacts to bird species. These included prohibiting vegetation clearing during the bird breeding season and minimizing the disturbance of habitat during mining. As with elk, CRC suggested that road mortality should be documented and slowdown zones implemented where indicated. CRC also suggested that the two American dipper nests could be moved from their current location to areas that would be free from disturbance.

CRC noted that some of the mitigation proposed would, of necessity, rely on the efforts of Weldwood and other land managers in the region. Examples of careful forest management

practices that might mitigate impacts included establishment of riparian management zones, wildlife-related tree and deadwood retention practices, and new silviculture techniques, such as partial forest harvesting. CRC also emphasized the importance of regional resource management plans to manage and mitigate the potential impacts of relocated recreational activities.

CRC said that recognizing wildlife habitat as a primary end land use and reviewing reclamation techniques appropriate to birds could also limit the duration of impacts. It advocated the implementation of reclamation techniques that create wildlife habitat by mimicking the natural disturbance regime where possible and the periodic monitoring of population abundance and distribution to document response of birds to reclamation over time. CRC stated that progressive reclamation and revegetation of mined areas would create new habitats for selected bird species before the end of mining in 2025. Species with specialized habitat requirements would be identified in the reclamation program, and specific actions would be taken to enhance their habitat.

CRC concluded that with mitigation the four species not breeding within the Cheviot Project area would be unaffected. The remaining eight species would experience minor, local, and reversible effects, which it judged to be insignificant. These conclusions, CRC said, were similar to the 1996 results. CRC felt that it had achieved a greater degree of certainty in the 1999 assessment by focusing on provincially yellow-listed species and by identifying regional mitigation practices that might reduce the cumulative impacts of development on bird species.

CRC stated that it would monitor breeding birds to track changes in the bird community over time. As the Project developed, CRC would also generate measures of ecological factors such as abundance, species richness, and biodiversity index values, as well as information on habitat variables.

CRC provided supplemental information regarding neotropical migratory birds in response to concerns raised by Environment Canada during the hearing. This included a scoping exercise using various information sources, an analysis of which species may be of concern within the context suggested at the hearing by Environment Canada, an assessment of effects on any new species arising out of the previous two matters, and options for management of any subsequent cumulative environmental effects. CRC concluded that there were a number of methods available for CEA and that, in its view, Environment Canada's general concerns regarding bird habitat had been addressed in the original 1996 Cheviot application and in the methods used in the 1999 assessment of selected birds. CRC felt that Environment Canada's proposal to assess the entire list of neotropical migrant bird species that may occur in the region was potentially misleading and that the applicant's own methods provided an effective CEA for neotropical migrants as well as other bird species of ecological importance in the Cheviot area.

Harlequin Ducks

In the 1996 Cheviot mine application, CRC determined that the Harlequin duck population associated with the headwaters of the McLeod River was regionally important. Impacts of mine development at that time were identified to be the direct loss of two probable breeding streams (Thornton and Cheviot Creeks) through rock dumping and the modification of a third probable

breeding stream (Harris Creek). The McLeod River would also be disrupted during the construction phase of development. Other potential negative impacts were identified regarding duck passage through culverts, particularly at Prospect Creek. A possible long-term reduction in the number of breeding females in the McLeod watershed was a residual impact of the Project.

The spatial boundary for the 1999 Harlequin duck CEA was defined as the McLeod River watershed (Figure 4); the temporal boundaries were the years 1996 and 2025. CRC reported in its 1999 CEA that it expected no cumulative effects on Harlequin ducks from regional activities but reported minor short-term or permanent local effects that it did not consider to be significant. CRC stated that the 1999 assessment was consistent with the 1996 results and that a greater degree of certainty had been gained due to ongoing studies and regional initiatives.

In the light of new evidence about the local and regional abundance and distribution of the species, CRC stated that it had downgraded its estimate of the magnitude of impacts on Harlequin ducks from the Cheviot Coal Project from major to minor. CRC's ongoing research showed that one of the streams that would be affected by Project, Cheviot Creek, was not, as previously suspected, a Harlequin breeding stream. It had, however, been able to confirm that Thornton and Harris Creeks were both Harlequin breeding streams.

CRC also noted that new information about the regional distribution of Harlequin ducks in Alberta had become available. The data gathered since the 1996 hearing showed that there were seven river systems in Alberta, including the McLeod/Whitehorse River system, with populations of between 40 and 80 Harlequins. Twenty systems had moderate numbers of Harlequin ducks (5 to 40 birds) and 13 systems had low numbers (1 to 4 birds). From these data, CRC concluded that Harlequin ducks were widespread throughout their range.

To assess the potential for regional impacts on Harlequin ducks, CRC reviewed the activities of other industries and activities in the region. Weldwood's compartment harvest schedules showed that most of the planned harvesting would occur downstream of the Harlequin breeding zone. Only one stream, Mckenzie Creek, was potentially affected by forestry activity in the next 25 years. Weldwood had indicated, however, that most of the land adjacent to the stream was a designated riparian management zone, which would not contribute to the annual allowable cut, and access to the adjacent areas to be harvested would not require building a crossing of Mckenzie Creek.

Future oil and gas activity, CRC said, was mainly to the east of the Harlequin habitat and therefore unlikely to impact breeding populations of these ducks. The ongoing operations at Inland Cement also did not appear to affect Harlequin ducks immediately adjacent in the McLeod River. A proposed extension to the Gregg River mine was predicted to have no significant impact on the Harlequin duck population, and other coal mining activity in the area falls outside the Harlequin duck range.

CRC noted that Harlequin ducks were reported to be potentially sensitive to in-stream activities, such as rafting and canoeing. CRC predicted, however, that the level of rafting activity reported on the Maligne River in Jasper National Park, which also had a significant population of

Harlequin ducks, was very unlikely to be matched in the McLeod River. An increase in angling activity in the McLeod River basin was expected in the prime duck brood-rearing portion of the river. CRC stated that if angling increased to the point where it impacted Harlequin ducks, the impact could be managed through angling regulation. Recreation pressures in Whitehorse Wildland Park were also predicted to stabilize in the near future. CRC saw the resource management plans being implemented in the region as tools to mitigate future impacts from recreational activities.

At the hearing, CRC reconfirmed its original plans to mitigate residual impacts on Harlequin ducks during both the construction and operation phases of the Project. A long-term monitoring program was planned to provide updated information in order to adapt these mitigation strategies throughout the life of the proposed mine. Initiation of and participation in cooperative regional studies was also a part of the management plan. CRC stated that it considered itself a catalyst to, as well as a participant in, the Foothills Model Forest Harlequin Duck Study. The purpose of that study was to establish a regional perspective on current knowledge and management needs, as well as public education opportunities in the Foothills Model Forest area.

CRC stated that regional inventories initiated by the Canadian Wildlife Service (CWS), AENV, and the Foothill Model Forest cooperative research program and detailed study on specific populations such as those found on the McLeod and Maligne Rivers have begun to provide an understanding of distribution, occurrence, and breeding biology of the Harlequin duck in Alberta. CRC believed that the identification of riparian management zones by Weldwood should also help to reduce the environmental impacts from regional development that Harlequin ducks would have experienced in the McLeod River watershed and other parts of their range.

CRC was asked under cross-examination to provide suggestions for the Whitehorse Wildland Park Draft Management Plan that might help to reduce impacts of expected increases in recreational activity on the Harlequin duck population. CRC emphasized the need to regulate angling activities, but felt that canoeing and kayaking would probably not be problematic, as those activities did not generally occur in the park. CRC noted the need to be careful with regard to the locations of trails and campgrounds and cautioned against permitting random camping. CRC also suggested that vegetation or topography buffers between streams and trails to avoid human disturbance of Harlequin ducks were important, as was education of park visitors on the needs of Harlequin ducks.

Grizzly Bears

CRC noted that the 1996 EIA concluded that, in the absence of a regionally based mitigation program, there would be both significant direct effects from the Project as well as cumulative effects on the grizzly bear and other large carnivores from other sources of development in the region. Because the company could not directly mitigate the impacts of its Project on large carnivores solely through activities within the Project boundaries, CRC proposed to be the catalyst for a regional program, which it called the Carnivore Compensation Program.

CRC reported that since 1966 there has been significant progress made towards implementing that regional mitigation strategy. It cited the development, through the Northern East Slopes

Environmental Resources Committee, of the document entitled "Grizzly Bear Conservation in the Alberta Yellowhead Ecosystem: A Strategic Framework" as an indication of that progress. CRC also cited the regional grizzly bear research program being coordinated through the Foothills Model Forest. CRC stated that due in part to the initiation of the regional conservation approach it recommended in the 1996 application, the 1999 CEA downgraded the cumulative effects on grizzly bears to insignificant. CRC stated that it also remained committed to participation in that conservation effort.

CRC considered grizzly bears to be an indicator species for the general quality of regional habitat for mammalian carnivores. CRC pointed to remarks made by Parks Canada and Dr. Ross in their submissions that validated the choice of the grizzly bear as a VEC. CRC also described the grizzly bear as an umbrella species accepted by Parks Canada as an indicator of ecosystem sustainability and integrity.

CRC described how other past, existing, and future human land uses were identified for the 1999 CEA. Past and current actions were identified through existing human use and habitat mapping and analysis of impacts of past human activities such as hunting. Future forestry activities were identified through spatially explicit compartment plans, periodic area forecasts by compartment based on the latest forest management plan process, and an extrapolation of road densities. Future mining activities were identified by CRC through spatially explicit mine plans. CRC interviewed oil and gas companies and extrapolated the numbers of wells to road and pipeline lengths and densities in order to identify future oil and gas activity. Finally, future recreation was identified by CRC through interviews with AENV land managers and extrapolation of historical use and populations.

The spatial and temporal boundaries originally established for the 1996 grizzly bear CEA were expanded upon by CRC for the 1999 assessment. There were two spatial boundaries involved for different parts of the analysis. An area of 55 000 km^2 was used strictly for population and mortality assessments, otherwise known as population viability assessments. No habitat or land-use mapping was done for this area. The second spatial area considered was 3040 km^2 and was used for CEM (Figure 5). This area was in turn divided into three BMUs, and nine bear management subunits (BMSUs) (Figure 6). Data were analyzed for each area for the "pre-berry" and "berry-and-after" seasons. CRC explained that its CEM involved the use of landscape indicator models as well as habitat and human use mapping.

Two temporal boundaries were used in the analysis by CRC. The first was a 25-year time frame, representing the life of the proposed Cheviot Coal Project, and the second was a 100-year time frame, used for long-term population modelling.

CRC explained that the analyses used in the grizzly bear CEA were based on standard techniques originally developed in the northwestern United States. Various indicators were employed to address different aspects of the grizzly bears' vulnerability to disturbance. The indicators used were habitat suitability, road density, habitat effectiveness, security area, linkage zone prediction, mortality, and population viability analysis (PVA). The issues of concern with respect to grizzly

bears in CRC's assessment were increased mortality, habitat alteration, habitat avoidance, and movement obstruction.

The habitat suitability component of the assessment was based on the assumption that the availability of preferred foods was the primary indicator of habitat suitability for grizzly bears. CRC concluded that grizzly bear habitat is currently diverse and productive in the regional study area. One of the BMUs supported high-quality multiseason habitat because of the presence of preferred food items and topographic diversity. CRC found that negative impacts on habitat suitability (as a result of development in the study area) were as high as 21 per cent at the BMSU level and that while regional alterations to habitat supply were positive for the pre-berry season, they were negative for the berry-and-after season. CRC added, however, that in its view, the negative habitat suitability impact in the berry-and-after season was minor.

CRC also measured the density of man-made linear features, a key element with respect to grizzly bear habitat conservation, in each BMU. CRC concluded that current road densities were well within accepted management standards for grizzly bears for all BMSUs and added that current road densities were less than the average values of core grizzly bear home ranges in Montana. CRC observed that the inclusion of the future roads associated with the approved forestry plans also did not exceed road density thresholds for any BMSUs. However, with extrapolated future forestry and oil and gas activities, road density thresholds could be exceeded in the three eastern BMSUs. CRC concluded that the effects of increased road densities on grizzly bear populations would depend on the success of access management and control.

In its initial evaluation, CRC only presented road density information for potential oil and gas development and for forestry activity until 2007. At the hearing, CRC undertook to extrapolate expected road densities until the year 2025 (Exhibit 234). This work indicated that there was not a large change expected in road density in BMU 2 between the years 2005 and 2025 for either forestry or oil and gas activity, but there was a significant change within BMU 3 over the same time frame. This extrapolation, however, also assumed no cooperation among various industries over road construction and road use.

CRC stated that the extrapolated road densities in BMU 3 would need to be halved from those projected in 2025 to ensure the survival of the grizzly bear population. The applicant stated that a key to facilitating such a reduction would be cooperation among industry members regarding access development and increased use and enforcement of access management tools, such as gated roads.

The third indicator employed by CRC was habitat effectiveness (HE), which was defined as the suitable habitat available to grizzly bears after taking into account the predicted avoidance effect in response to human use. CRC assessed the HE value for the regional Cheviot CEA to be 73 per cent in 1999. Effects of approved mining and forestry plans did not significantly change CRC's prediction of the HE value by 2025. Future potential oil and gas and forestry activities were predicted to result in declines in the HE value for individual BMSUs of between 9 and 20 per cent. This prediction assumed no access management or shared infrastructure. Generally, CRC predicted that a threshold HE value of 70 per cent would be exceeded in the eastern BMSUs if no

access control were implemented. CRC highlighted its view that changes in HE depended on increases in the human population and recreational use of the area and was not easily quantified.

The fourth indicator for grizzly bears used by CRC was security area analysis. Secure areas were defined as areas in which bears could forage for 24 to 48 hours secure from human disturbance. CRC found that lands within the CEA supported relatively high levels of security for most BMSUs. The comparatively lower security found in Jasper National Park (BMU 1) was described by CRC to be an artifact of topography, but nonetheless indicated a sensitivity to valley bottom development. The eastern portion of the study area (BMU 3) had high security due to gentle topography and low densities of high-use roads. The central portion of the study area (BMU 2), where the proposed Cheviot mine would occur, had security areas near accepted management targets for the United States. CRC stated that areas with less than ideal security conditions might still be used by grizzly bears, but this might lead to a higher risk of mortality and habituation.

CRC used a linkage zone analysis as an indicator to assess the potential for natural corridors, natural barriers, and human disturbances on the landscape to either enhance or interrupt grizzly bear movements. CRC concluded that the vast majority of the CEM area (95 per cent) did not impede grizzly bear movement at the time of the assessment. Fracture zones (zones impeding bear movement) occurred in areas of intensive local activity, such as the proposed Cheviot mine and other mines, particularly in mountainous terrain. Neither forestry nor oil and gas activity appeared to create fracture zones. Three linkage zones were identified by CRC, and the applicant concluded that reclamation of the existing Luscar mine site by 2025 would soften the negative impact of the fracture zone identified there in 1999.

Mortality was the next indicator considered. CRC expressed the view that direct human-caused mortality was arguably the cause of virtually all grizzly bear population decline and that human access was the primary mediator of this mortality. While mortality was considered to be the fundamental limiting factor for all animal populations, it was particularly significant for grizzly bears because of their low reproductive rate. CRC concluded from its analysis of grizzly bear mortality in both Jasper National Park and the Province of Alberta that current rates were well within accepted standards and that a clear trend toward decreasing grizzly bear mortality was revealed by the data. Legal hunting was determined to be the primary source of mortality for bears on Alberta provincial lands, while railway and highway collisions were found to be the major cause of bear mortality in Jasper National Park. CRC stated that improved garbage management in Jasper National Park and a limited entry hunt in Alberta were the main reasons for the trend towards decreasing mortality. CRC stated that the capability exists to further reduce mortality through hunting regulations and access restriction. CRC noted that the recent percentage of female grizzly bear mortality in Alberta Bear Management Area 4B (which includes the provincial portion of the CEA study area) was high and in its view needed to be reduced.

Finally, CRC conducted a PVA to evaluate the likelihood of long-term persistence of the grizzly bear population. From the PVA it predicted that the grizzly bears were likely to persist in the

region for the next century. The probability of decline over a 100-year time frame was predicted to be low, with no probability of regional extirpation over that period.

Based on its analysis, CRC stated that the effects of the Cheviot mine on grizzly bears were locally significant for three of the four issues of concern (habitat alteration, habitat avoidance, and movement obstruction). Assuming the success of the majority of mitigation measures proposed, the effects of the Project were, however, regionally insignificant.

Despite its lack of significance at the time of the CEA, the potential for increased human-caused mortality was seen as the issue of most concern regarding grizzly bears. In order to further reduce the risk of increased mortality, CRC reiterated its support for firearm and hunting restrictions, waste management control, reduced traffic speeds, and bear awareness and safety training for its staff as means to mitigate some of the adverse effects of the development on bears.

On a regional basis, CRC's consultant, John Kansas, advocated the continuation of the limited-entry-draw hunting restrictions for grizzly bears in order to mitigate regional sources of mortality. He suggested that the grizzly bear hunt might be further reduced should population-monitoring results from the Foothills Model Forest research warrant that. He also recommended selective road closures in areas of secure, high, and very high-quality habitat, especially BMSU 3A. The Strategic Framework was also cited as a method to promote interindustry planning of open road access in order to reduce or restrict entry into secure, high-suitability grizzly bear habitat. It was suggested that geographic information system (GIS) technology and human-use databases be used to develop access management plans that account for the habitat and security needs of grizzly bears. To counteract potential increases in grizzly bear mortality, CRC's consultant suggested that additional hunting restrictions be considered and proposed the creation of roadside "no-hunting" buffers along the Grave Flats Road.

CRC also reconfirmed its original proposals to mitigate the potential effects of grizzly bear habitat alteration by mine development, including reclaiming the site to optimize and protect forage production and security cover.

CRC's consultant suggested that regional grizzly bear habitat maps be supplied to industry planners and that an industry/government planning framework for minimizing impacts on seasonally important grizzly bear habitats be developed. He stated that mitigation of seasonal impacts could be achieved through avoidance and timing restrictions. The consultant also recommended that certain plant species (e.g., clover, legumes) known to attract grazing grizzlies be avoided when planting large, open rights-of-way with high traffic volumes, adding that such measures could also minimize opportunities for shooting bears from roads. Another regionally pertinent mitigation measure suggested by CRC's consultant was the selective use of certain silvicultural techniques to enhance grizzly bear forage. He suggested that to increase the effectiveness of this measure, areas selected should be based on grizzly bear needs as indicated by research findings from the Foothills Model Forest grizzly bear study. Finally, with respect to mitigation for habitat alteration, he suggested that planting food sources attractive to grizzly bears on reclaimed well pads and pipelines should be discouraged in the region.

To address the issue of habitat avoidance at the mine site, CRC reconfirmed that it would limit motorized access after reclamation until adequate cover had been re-established, restrict employee use of partially reclaimed areas, particularly in the Prospect Creek region, and incorporate sound and sight barriers into the postmining landscape features.

CRC also provided several examples of mitigation measures that could reduce grizzly bear habitat avoidance on a regional scale. The first was to improve human-use inventory and monitoring through sound monitors and other techniques to more fully understand human use of the landscape as it relates to grizzly bear CEM models. CRC also suggested monitoring the effects of human road-use levels on grizzly bear use of the landscape through the Foothills Model Forest study. CRC's consultant stated that consideration should be given to the use of the regional CEM model results from the 1999 CEA as a preliminary framework for testing grizzly bear landscape use.

Once targets for open-road densities, security, and habitat effectiveness were determined for the region, CRC's grizzly bear consultant advocated an accounting system for industries to meet these requirements through mitigation techniques such as road closures. Such a system, he believed, could be implemented through the Strategic Framework.

Finally, with respect to regional habitat avoidance concerns, CRC's consultant identified a need to work with OHV user groups to attempt to focus OHV use into intensive-use areas that do not clash with seasonal grizzly bear habitat needs. He suggested that involving OHV groups in science-based access management that reflects real (versus modelled) responses of bears to human use would facilitate successful implementation of this mitigation measure.

With regard to mitigating movement obstruction, CRC's consultant proposed the following Project-specific mitigation measures to counteract potential impacts:

- design postmining landscape features along the southern edge of the western third of the proposed mine (upper Prospect Creek area) to facilitate use of this linkage zone by grizzly bears for east-west movement;

- retain tree islands to enhance movement across the mine site, as per the Cheviot Mine Reclamation Plan; and

- design land bridges or topographic modifications to connect known use areas that have been identified through radiotelemetry data.

CRC's consultant suggested that linkage-zone prediction mapping should be updated regularly to ensure that fracture zones are kept to a minimum and that low-human-use movement corridors link areas of high-suitability, secure habitat. This measure would be particularly important along riparian areas throughout the region.

In its concluding comments regarding grizzly bears, CRC stated that the grizzly bear population density in the Cheviot CEA and the Yellowhead region was at or above levels typically observed

along the eastern front of the Rocky Mountains. CRC felt that federal and provincial government departments have managed mortality effectively since the late 1980s and that landscape condition indicators at the time of assessment were generally within acceptable levels for grizzly bear population persistence. Future access development at the level predicted by CRC was seen as having the potential to breach the thresholds for these landscape indicators, particularly along the eastern portion of the CEM study area (BMU 3). The need to validate landscape indicators on a region-specific basis was identified by CRC, and the Foothills Model Forest grizzly bear study was seen as being ideally situated to monitor bear response to access management. CRC stated that shared access, selective road closures, and other techniques would be required to minimize the potential for grizzly bear landscape condition indicator thresholds to be breached.

Further comment was provided by Dr. Herrero for CRC regarding an overview of grizzly bear conservation with respect to the proposed Cheviot Project and comparing the current state of grizzly bear conservation to the status in 1997. Dr. Herrero provided the Panel with his evaluation and recommendations regarding the proposed and evolving management of specific and cumulative effects on grizzly bears related to the proposed Cheviot mine.

Dr. Herrero defined the concept of thresholds as "landscape condition values below which scientific evidence suggests that the long-term persistence of grizzly bears cannot be assured." Regarding the proposed three-year delay in setting target and threshold values for the Strategic Framework, Dr. Herrero stated that land and grizzly bear population managers were left without firm direction. It was suggested that application of the "precautionary principle" in setting conservative thresholds should be employed, so as not to have possible irreversible negative effects on grizzly bears.

Dr. Herrero stated that the potential to achieve regional-scale grizzly bear conservation continues to evolve. He noted that the most important potential limitation of the Strategic Framework was previously identified by the Panel when it concluded that "the Panel believes that both the EUB and AEP [now AENV] may need to re-examine the process by which new licences are granted to other regional industry players for developments which may also have a cumulative effect on carnivores." Dr. Herrero said that in order to manage the potentially adverse effects, the applicants that would cause each potential adverse effect, such as new road construction, must have their activities subject to regulation with the scientifically determined needs of grizzly bears being taken into account. He further stated that substantial progress had been made since 1996 toward understanding the status of grizzly bears in the Yellowhead Region and establishing the conditions required for grizzly bear persistence in a landscape undergoing substantial industrial activity. Dr. Herrero added that the administrative structure for managing cumulative effects had been designed and was on the verge of being implemented through the Strategic Framework. He stated that the grizzly bear's future in the Yellowhead ecosystem hinged significantly on the successful implementation of the Strategic Framework.

During cross-examination, Dr. Herrero was asked whether at some point during the research the "umbrella-nature" of the grizzly bear species to capture the ecosystem requirements of other species was lost. Dr. Herrero responded that the landscape condition indicators for grizzly bears would be suitable for other species, but that at the level of specific habitat suitability the research

results are more grizzly bear specific. He noted that if a species's ecosystem requirements were not captured through the grizzly bear research, it would likely be a species with a smaller home-range size than a grizzly bear and with higher reproductive capability, indicating a greater resilience than the grizzly bear has. He agreed, however, that in concentrating largely on the needs of grizzly bears, it was possible that other species' requirements would not be accounted for. In order to create a more comprehensive carnivore compensation strategy, as outlined in CRC's original application for the proposed Cheviot mine, Dr. Herrero agreed that other species, such as fisher and lynx, should eventually be taken into account.

When asked about the reliability of predicting cumulative effects on grizzly bears using a modelling approach, Dr. Herrero responded that the model had apparently used the best available information. He added that caution should be used when interpreting grizzly bear response to specific numbers predicted by modelling approaches, such as percentage values used to indicate habitat effectiveness.

Dr. Herrero was asked to explain why grizzly bear trails had not been used as a component of the grizzly bear research. He responded that while bear trails are fairly common and have distinctive characteristics, the scale of the research required for this CEA could not accommodate the use of trails as an indicator. Consideration of bear trails would have required a level of intensity of sampling not possible within the context of this CEA on grizzly bears. In addition, it would be difficult to differentiate between wear left by bears as opposed to other animals. He explained that the clearest trails delineated by the current research corresponded to the movement routes designated by telemetry points, and over time these were likely to reveal bear travel corridors more clearly.

Dr. Herrero was also asked about the expected significance of residual cumulative effects on bears. He stated that the success of the Strategic Framework would be fundamental to the state and distribution of the grizzly bear population. If the Strategic Framework was not completely successful, Dr. Herrero anticipated grizzly bear population declines. Despite this, he stated that he had no reason to suspect extirpation of the grizzly bear at a regional level. In summary, he said that the significance of residual cumulative effects would be affected by the assumed mitigation and management measures that have yet to be implemented.

When asked how the most crucial mitigation measure might effectively be implemented, Dr. Herrero stressed that to ensure successful implementation of such measures as road closures, a large part of the effort should be toward public involvement and information sharing. He pointed out that despite resistance to change by individual disposition holders, scientific evidence suggested that there needed to be a change in how resource development was managed. Dr. Herrero encouraged the Panel, in its recommendations, to find methods that would be acceptable to disposition and jurisdiction holders but that would also encourage them to tackle complex issues, such as access management.

7.3.2 Views of the Interveners

Vegetation and Botanical Resources

AENV noted the downgrading of the significance of the loss of old-growth forest and the modification of the position respecting the number of valued plant species in CRC's 1999 CEA of vegetation and botanical resources. AENV emphasized that it continued to hold the view expressed in its 1997 submission that all aspects of the mine development and reclamation should be aimed towards minimizing impacts on ecologically significant vegetation types where possible and should not restrict the reclaimed sites' potential to evolve naturally.

It was the opinion of the ACC/ANPC that any marked differences in vegetation in 2025 from the 1999 scenario would indicate a significant impact. The ACC/ANPC acknowledged that some effects would diminish with time and mitigation, but maintained that the uncertainty associated with other variables required a more cautious approach to assessing impact significance. The ACC/ANPC noted that it could take 50 to 100 years for forest biodiversity to return and possibly 30 to 50 years for other plant species to become established. They pointed out that reclamation that had been ongoing for 20 years at the CRC Luscar mine site was by no means complete and that the number of recolonized native plant species remained limited.

The ACC/ANPC also believed that not accounting for linear developments, such as roads, was a major omission in CRC's vegetation analysis. While CRC had stated that this would represent a relatively small loss, ACC/ANPC believed that the potential 560 km of new roads should have been accounted for.

The ACC/ANPC noted that the nationally rare moss *Mielichhoferia macrocarpa* was omitted from the list of valued species by CRC. They believed that such species must be taken into account when dealing with road access plans. The intervener stated that other rare mosses had, in their view, also been ignored.

The ACC/ANPC stated that they were pleased to see the withdrawal of the upper Prospect Creek from the mine permit area, since that would mean less impact on rare alpine species. The ACC/ANPC believed that efforts at transplanting the remaining valued plant species should be continued, but since such efforts were not often successful, they expressed concern that the probability of success for this mitigation effort was not high.

The ACC/ANPC were not convinced that the reclassification of previously designated "old-growth" Englemann spruce-subalpine fir was appropriate, except to increase its apparent extent and thus diminish the significance of the loss of the small area in Powerhouse Creek. They argued that this mixed-aged subalpine forest, with canopy gaps and components older than individual trees, was a community worth preserving. The ACC/ANPC was in agreement with suggestions for mitigation measures to minimize the amount of old-growth forest cleared, specifically in the Powerhouse Creek, directly adjacent to the ecologically significant Cardinal Divide.

Elk

AENV stated that it was prepared to accept CRC's analysis of the impacts on elk. In its 1997 submission to the Panel, AENV stated that the proposed mitigation by CRC required implementation of the Coal Branch Access Management Plan. AENV confirmed that in 1999 a forest land-use zone restricting motorized access in the areas identified in the Access Management Plan was established. AENV stated that it continued to hold the view that, in the event that the proposed Cheviot Project proceeded, CRC would need to establish an elk monitoring program.

Under cross-examination, AENV was asked whether, in its opinion, elk populations were recovering in the Mountain Park area to historic levels for the Eastern Slopes. AENV replied that while it did not have empirical data from 50 years ago, data collected over the last 20 years indicated that elk were not declining and that the population appeared to be viable. AENV said that because of a lack of fire control and subsequent rejuvenation of grasslands in the late 1960s, elk populations had probably peaked. AENV noted that at the turn of the last century there were few elk in Alberta, and the Ruby Lakes area was described as being one of the few refuges for elk in the province. AENV said elk numbers in west-central Alberta today were largely due to transplants of elk from Yellowstone Park to Jasper National Park and the Athabasca area just north of Hinton. AENV also explained that elk were subject to a very limited hunting harvest.

Mr. Mitchell attested to the reintroduction of elk to the area in past years and to the fluctuations in elk populations over the last several decades. In his view, the elk population in the area was likely to remain viable.

Selected Bird Species

With regard to the CEA for selected birds, Environment Canada said that this VEC should include all species that can be reasonably expected to occur in the study area, rather than indicator species alone. In its opinion, the species should be grouped by their habitat associations, and the environmental issues involving neotropical migratory birds in particular should have been examined on a much larger scale (i.e., continental) than that used by CRC. Environment Canada pointed to documented declines in North American bird species and cited its efforts targeted at preventing the loss of species, including the United Nations Convention on Biological Diversity and the Canadian Biodiversity Strategy.

Environment Canada emphasized the need to look at a large area when dealing with cumulative effects. It cautioned against basing decisions on small sample sizes, especially with respect to breeding birds, which may have very different population trends depending on whether they are considered on a provincial, national, or continental scale. Environment Canada pointed out that even if a species that was abundant in the Project area might not be significantly affected by the proposed development, it might be experiencing population declines elsewhere, highlighting the need to protect the core ranges of that species.

With respect to mitigation, Environment Canada felt that CRC should have more closely examined potential mitigation measures both within the Project area and within the entire region (i.e., the cumulative effects study area). In the regional context, Environment Canada was of the

opinion that a need existed to preserve critical habitat. Environment Canada emphasized this point by explaining that the ecoregion in which the proposed Cheviot Coal Project would occur had the highest bird species richness in North America. It stated that the ecoregion, as identified by the Canadian Biodiversity Strategy, was also considered at high risk for loss of biodiversity. Environment Canada attributed these declines to the incremental impacts of human activity, and more specifically to habitat loss.

Environment Canada highlighted Canada's signing of the United Nations Convention on Biological Diversity in 1992, obliging Canada to conserve ecosystems, species, and genetic diversity to ensure that the earth's biological resources would be used wisely. It identified several initiatives aimed at breeding bird conservation, including Partners in Flight, Important Bird Areas, and the North American Bird Conservation Initiative.

Environment Canada felt that CRC had failed to adequately justify how the twelve indicator species chosen were representative of the other bird species CRC had found in the CEA area. It also believed that bird habitat had been poorly represented in the CEA. Environment Canada recommended a re-evaluation of the selected bird species VEC, involving a selection of migratory birds representative of the entire bird community, and further consideration of the need to protect riparian areas in particular. It also recommended an adaptive management approach to the maintenance of selected migratory birds and long-term monitoring and implementation of appropriate mitigation strategies, along with compensation for any losses that might occur.

Environment Canada recommended the Panel direct the applicant to re-evaluate the selected bird species CEA. It also asked the Panel to recommend to the provincial and federal governments that they undertake a CEA of human activities in the boreal forest on land birds in general.

During the hearing Environment Canada undertook to provide a description of the type of work it felt needed to be done to complete the CEA of the selected bird species VEC. It also provided an estimate of the person-hours required to complete the task and of the ability of Environment Canada to do that additional work. It indicated that the recommended re-evaluation of the bird species CEA would not be a substantial one in terms of time and resources. However, Environment Canada, when questioned, indicated that it did not have adequate resources to carry out the analysis in a timely fashion. Environment Canada also added that while the additional CEA was not likely to alter the ultimate recommendation of the Panel, such an analysis might result in a number of alternative mitigation measures. Such mitigation measures could be incorporated into the Project as it was developed. Environment Canada did agree to work with CRC to adapt the suggested process to the CEA analysis and to seek any other relevant sources of information.

The AWA Coalition and CNF stated that they agreed with Environment Canada that the assessment of the selected bird species VEC was inadequate, particularly in light of Canada's international agreements. CNF went further to say that this shortcoming damaged the validity of the CEA. The ACC/ANPC added that inadequate mitigation had been proposed for the impacts to neotropical migratory birds.

AENV stated that CRC's analysis of potential impacts of the proposed development and cumulative effects on selected birds was, in its view, acceptable.

Mr. Clark, a consultant, proposed that Environment Canada's views regarding the CEA methods for selected bird species were unfounded, as it was unlikely that all species of birds of concern in the boreal forest would congregate at the proposed Cheviot mine site.

Harlequin Ducks

Environment Canada presented its interpretation of the research results arising from aerial surveys conducted by the CWS in cooperation with AENV in 1998 and 1999. Environment Canada stated that the surveys had confirmed that Harlequin ducks occurred in discrete clumps or patches where there appeared to be optimal habitat conditions. Although Harlequin ducks were widely distributed in Alberta, Environment Canada noted that because of their patchy distribution, they were generally uncommon in the province.

Environment Canada expressed a concern that the proposed Project might permanently damage the McLeod River Harlequin duck population, particularly since the McLeod River basin was also affected by development activities such as additional coal mining, limestone mining, road upgrading, and recreational activities. In its view, measures were required to avoid a permanent impact on Harlequin ducks resulting in an unsustainable population. Environment Canada referred to literature that emphasized that even low mortality rates might indicate long-term population decline.

Environment Canada expressed concern that long, narrow culverts at stream crossings might prove to be a barrier to Harlequin ducks. If this were the case, four breeding streams, rather than the two reported by CRC, would be impacted. In addition, if predictions with respect to water quality and water quantity proved to be inaccurate, Environment Canada felt that this could also negatively impact the Harlequin duck habitat. Environment Canada advised the Panel to use special caution when assessing the potential cumulative environmental effects on Harlequin ducks.

Related to the topic of Harlequin duck protection was Environment Canada's position with respect to riparian habitat in general. It discussed the relatively high species diversity associated with riparian areas, their function as natural travel corridors, and the need to focus on riparian areas when attempting to maintain ecosystems. Environment Canada stressed that if riparian areas were protected for the purpose of maintaining healthy Harlequin duck populations, other components of the ecosystem would also be conserved.

During the hearing, the Panel asked Environment Canada what approvals it might have sought or was intending to provide with respect to the proposed Cheviot Project. In response, Environment Canada drew attention to its original submission dated January 1997 and stated that details on its mandate were provided in that document. Environment Canada stated that an important aspect of that mandate included regulatory responsibilities under the *Canadian Environmental Protection Act*, the *Migratory Birds Convention Act and Regulations*, and the Pollution Prevention Provisions, under Section 36(3) of the *Fisheries Act*.

AENV pointed out that the Green wildlife status designation (species not at risk) for the Harlequin duck was under review at the time of its 1997 submission, and that Harlequin ducks were now listed as a Yellow (A) species. The Yellow (A) designation in this case denoted concern about long-term population declines. AENV stated that it had a somewhat different interpretation from CRC of the results of the regional survey of Harlequin ducks. Where CRC characterized the ducks as widespread in the Northern Rocky Mountains and Foothills regions, AENV believed the ducks were patchily distributed over a wide geographic area. Overall, AENV stated that it accepted CRC's analysis of the potential impacts on Harlequin ducks, but that ongoing monitoring would be required.

By way of clarification, AENV outlined the Harlequin duck research initiatives ongoing in the Northern East Slopes region. These were the Cheviot Harlequin duck study conducted by CRC, the AENV/CWS regional surveys, and the ongoing Foothills Model Forest Harlequin duck program, which was initiated in 1998. The latter study was designed to examine the relationship between hydrologic features and Harlequin duck presence.

The ACC/ANPC commented that there was a significant difference between CRC's comment that Harlequin ducks were widespread and Environment Canada's comment that their distribution was patchy and in areas liable to development pressure. The ACC/ANPC stated that this contradiction highlighted the need to be wary when attaching significance to statistical averages while ignoring local ecosystems.

Mr. Mitchell expressed some concern with respect to the Harlequin duck population as a result of personal communication with a British Columbia resident. The concern regarded the potential for negative impacts on the Harlequin duck population in Alberta affecting the British Columbia Harlequin duck population.

The WCWC stated that it was sceptical of the conclusions drawn by the applicant regarding cumulative effects on Harlequin ducks. The WCWC highlighted CRC's statement that while recreational activities had increased at a rate of 5-10 per cent per year, recreational activities were not expected to affect Harlequin ducks in the future or that effects would be minimal. The WCWC stated that the methods used to reach those conclusions were not adequately explained and the lack of clarity was a significant shortcoming in the CEA. The WCWC stated that this shortcoming could be resolved with an additional disclosure of how CRC's conclusions regarding the effects of recreation on Harlequin ducks were drawn. There also remained uncertainty, in the WCWC's view, about the proper use of information about future forestry activity in the assessment of cumulative effects on Harlequin ducks. The WCWC felt that it would not be prudent to approve the proposed development given what appeared to be a deficient CEA.

Mr. Clark expressed the view that concern over Harlequin ducks was exaggerated. He noted that Harlequin ducks are a migratory bird resident in the Mountain Park area during summer months. He stated that this bird is common in North America and that they frequent shorelines in large

numbers. In addition, Mr. Clark stated that Harlequin ducks are summer residents in many lakes and streams in the national parks and outside of the parks.

Grizzly Bears

Parks Canada made two separate presentations to the Panel in the form of direct evidence specifically relating to the grizzly bear VEC analysis. The first presentation related to the Strategic Framework authorized in February 2000. Parks Canada explained that the main objective of the Strategic Framework was to find an effective approach to cooperative grizzly bear management, and that effective landscape or ecosystem management requires cooperation among all interests.

Parks Canada reviewed the current status of the grizzly bear, stating that in Alberta this species is currently "Blue-listed" (meaning that a species may be at risk because of noncyclical declines in population or habitat or because of reductions in provincial distribution) and that nationally the Committee on the Status of Endangered Wildlife in Canada categorizes the grizzly bear as vulnerable to human disturbance. Because of these classifications, Parks Canada identified the grizzly bear as a species of management concern regionally, nationally, and internationally.

The Northern East Slopes region was identified by Parks Canada as having an estimated 30 per cent of the provincial grizzly bear population. While such a high number might seem to indicate a secure grizzly bear population, Parks Canada described the need for better management of grizzly bears as urgent, noting several gaps in current knowledge. Parks Canada emphasized the need for a cautious and adaptive management approach while the needed research was conducted.

Parks Canada stated that the Strategic Framework had developed out of needs identified in the Panel's 1997 decision report and reflected an agreement between the governments of Canada and Alberta regarding grizzly bear conservation and impact mitigation. The objective of the Strategic Framework was to cooperatively manage for landscape and population conditions necessary to ensure the long-term persistence of a healthy population of grizzly bears within their current range in the Alberta Yellowhead ecosystem. Parks Canada stated that the Strategic Framework clearly identified that "healthy" in the context of grizzly bears meant populations that were viable, nondeclining, and connected on the landscape. It emphasized that grizzly bear conservation must be part of an overall integrated resource management strategy. Parks Canada identified other grizzly bear management initiatives and stated that grizzly bear conservation would be implemented through existing plans and programs, such as those for park management, forest management, and access management.

Parks Canada saw threshold values for a number of conditions as necessary to maintain and enhance grizzly bear population size, health, and distribution within the regional ecosystem. It stated that suitable threshold values were recognized by grizzly bear experts to be required in five critical areas: habitat effectiveness, security area, total human-caused mortality, road density, and habitat connectivity. Parks Canada emphasized that it was important not only to establish clear threshold values for each indicator, but also to set target values that management agencies would strive to achieve. It said that the Strategic Framework identified the need to establish such

landscape condition target and threshold values for each of the five criteria within three years. It described part of the existing work plan for the Strategic Framework as including a strategy for stakeholder participation, developing a funding and participation strategy, and identifying resource requirements to implement the Strategic Framework.

Parks Canada identified the Regional Carnivore Management Group as the group that would develop an interim process to effectively deal with new development proposals, particularly issues of concern related to grizzly bear conservation. Parks Canada also described a number of partnerships supporting the goals of the Strategic Framework, such as the Yellowhead Ecosystem Working Group and the Cheviot Carnivore Compensation Program. Parks Canada concluded its views on the Strategic Framework for grizzly bears by emphasizing that despite progress to date, a great deal more work was required to move the Strategic Framework from document form to practical application.

Parks Canada made a second presentation with regard to the grizzly bear VEC assessment of the CEA. Parks Canada stated that while it was generally satisfied with the spatial boundaries and attributes of the CEA for grizzly bears, it remained concerned that the pattern of human activity across the landscape had not been adequately captured. Parks Canada did commend CRC's efforts to bring updated information before the Panel during the hearing and felt that the updated information demonstrated some significant improvements in terms of road density, security area analysis, and linkage zones when compared with the information presented by CRC in 1996.

Parks Canada's consultant commented on the various indicators used by CRC in its CEA analysis of the grizzly bear VEC. He noted that the distribution component of habitat effectiveness (HE) was very important and had been explicitly incorporated into recovery plans in the United States. Parks Canada's consultant observed that managers in many grizzly bear jurisdictions in the US were embracing HE values of 70 to 80 per cent. He suggested that for grizzly bear management to be successful, HE thresholds should be met in nearly every management unit across the landscape. This would result in a distributed population of grizzly bears. Populations with better distribution would have a better chance of persistence in the long term.

Parks Canada stated that, from its perspective, the revised values that CRC presented during the hearing regarding forestry and oil and gas activity were discouraging. It saw the maintenance of grizzly bear populations beyond the park boundaries as a key element of maintaining ecological integrity within the park. It said that future scenarios accounting for forestry, oil and gas, and recreation resulted in potential habitat effectiveness values well below what Parks Canada believed were acceptable thresholds in the eastern BMUs. Parks Canada stated that while some people might perceive such scenarios as a "worst case," managers must come to terms with the potential for that level of development. Parks Canada noted in particular a potential for significant increase in road density due to oil and gas activity in BMU 3, well above the CRC's selected total road density standard of 0.6 km/km^2.

Parks Canada highlighted the relationship that CRC's consultant reported in 1999 between approved forest cut-blocks and associated roads. Parks Canada expected that there would be

approximately 1.27 km of new roads for every square kilometre of cut-block. When Parks Canada calculated that relationship for the 270 km^2 of planned forest harvest over the next 25 years in the Cheviot CEA, it found that 343 km of new roads could be built. That would increase the total road density, and in the case of BMSU 3B, the road density could be as high as 1.01 km/km^2. Parks Canada believed that this density was above acceptable standards for grizzly bear survival.

With respect to "security area," Parks Canada noted that it was important to quantify this variable in terms of areas that bears actually use and to subtract the areas not available to bears. Parks Canada's consultant also pointed out that the threshold security area values used in the Cheviot CEA were developed for use in the United States (i.e., Glacier National Park and Yellowstone Park), where most of the landscape is usable. In Canada, specifically in Jasper National Park, Parks Canada noted that much of the area was not suitable for bears due to the presence of mountains and glaciers. Parks Canada also observed that because changes in security status would occur primarily in different BMSUs than the one occupied by the proposed Cheviot mine, the cumulative effect would be a lowering of security in the overall landscape. Parks Canada also stated that the zone of influence around human activities would affect the minimum size of a security area. It noted that a considerable decrease in security areas occurred with projections of future oil and gas, forestry, and recreational activity.

Another indicator reviewed by Parks Canada was the concept of linkage zones. Parks Canada noted that the proposed Cheviot mine was near to some key mountain passes used by bears. It pointed out that the Luscar and Gregg River mines had created fracture zones, and the proposed Cheviot mine would have this effect as well.

With regard to mortality standards, Parks Canada noted that this indicator was among the better-researched and quantified areas of grizzly bear management. In the view of Parks Canada's consultant, to ensure long-term viability of grizzly bear populations, total human-caused mortality should not exceed 6 per cent of the existing grizzly bear population, including both recorded and unrecorded mortality. He suggested that for every reported bear mortality, there was an almost equivalent unreported bear mortality rate. When reported mortality was corrected for the unreported factor, Parks Canada found that the rates in the Cheviot area were high. In Parks Canada's opinion, implementation of limited-entry hunting in the province in 1988 had ameliorated this concern. However, a critical assumption in allowing hunting was that bear populations has been accurately estimated; therefore there was a need for caution.

Parks Canada stated that it was also concerned about CRC's PVA modelling technique, as 60 per cent of the population modelled represented bears living in southeast British Columbia. That area, it said, had the highest density of bears in North America and the population had had very high reproductive, survivorship, and growth rates over the last 10 to 15 years. Parks Canada argued that such a population might not be representative of the bear population in the area of concern at this hearing, and therefore the CRC's study might have overestimated the resiliency of the grizzly bear population to cumulative effects across the CEA study area. Parks Canada concluded that while the PVA was a valuable tool, some caution in the interpretation of its results was warranted.

Parks Canada stated that it did not believe that there was a cumulative effects problem on the landscape at the time of the hearing with regard to grizzly bears. However, such a problem was potentially imminent, particularly in BMSUs 2A and 3A. Given the available information regarding the potential for future road development for oil and gas and forestry activity, Parks Canada stated that habitat suitability, habitat effectiveness, and security areas would likely fall below acceptable standards in nearly all the BMSUs within BMUs 2 and 3 in the future.

Parks Canada noted that the loss of suitable grizzly bear habitat in the region was not a unique circumstance in North America, but that the problem was increasing with time. With respect to landscape connectivity, Parks Canada felt that the potential for the development of fracture zones needed to be examined closely and alternative routes for bear travel needed to be available. It stated that human-caused mortality appeared to have been reduced in recent years but might remain at or above desired standards. It believed that the likelihood of indirect mortality might increase in the future due to increased human activity, especially road building.

Parks Canada said that maintaining a viable, connected population of grizzly bears was essential to maintaining the ecological integrity of Jasper National Park. In its view, the potential effects on grizzly bears at both the proposed project level and within the larger CEA study were significant. It also concluded that the risk of excessive mortality and obstruction of movement to grizzly bears was high. Parks Canada emphasized the need for interagency stakeholder involvement when developing grizzly bear management frameworks and the need to embrace standards or thresholds as a guide for managing large landscapes over time. It argued that such a goal could only be achieved at the regional scale and could not be accomplished solely within park boundaries. Parks Canada conceded that its regulatory role did not extend beyond the national park boundaries but also noted that it had been invited by the province to participate within the ongoing regional planning initiatives. Parks Canada confirmed that it had been actively participating in these initiatives and that it intended to do so in the future.

The ACC/ANPC commented on use of the grizzly bear as an umbrella species and cautioned that not all species share the grizzly's habitat preferences. For example, it noted that, unlike grizzly bears, the wolverine depends on old-growth forest. Therefore, not all species would be represented by grizzly bears if this were the only indicator of ecosystem health.

The ACC/ANPC commended the useful and quantitative nature of CRC's work but stated that it it was concerned with the high margin of error involved. It also expressed concern regarding the use of only two temporal points in CRC's analysis of cumulative effects on grizzly bears, while acknowledging that the analysis did point to some significant conclusions. However, in ACC/ANPC's view, many of the impacts were potentially underestimated.

The ACC/ANPC stated that road density, habitat effectiveness, and connectivity were major determinants for large carnivore security and that the projected human disturbance map for 2025 presented by CRC was incomplete, because either no forestry roads were shown or they were shown as low-use OHV trails. Other roads were shown as having no changes since 1999, despite potential changes from oil and gas activities, increased OHV disturbances, and changes in

recreation patterns from end-pit lakes, mine roads, etc. The increased road activity from forestry alone was estimated as an extra 560 km, which was perceived as a highly significant change. It was the ACC/ANPC's view that since only approved forestry was accounted for in the 1999 CEA, the cumulative effects of forestry activities were considerably underestimated.

The ACC/ANPC stated that frequent claims had been made that with proper mitigation wildlife (including grizzly bears) would return to reclaimed mines. The ACC/ANPC noted that the example cited to support this argument, namely the CRC Luscar mine, differs in one important respect from the proposed Cheviot mine: there is essentially no OHV or hunting activity in that area. It suggested that strong measures would be required to restrict OHV and hunting activity both during and after mining if a comparable level of successful reintroduction were to be achieved.

The ACC/ANPC noted that the security area analysis map produced by CRC showed a similar degree of disturbance for all linear features, regardless of geography, and they were consequently uncertain that all variables had been taken into account. (e.g., more alienation when food resources are concentrated in valley bottoms, less security on rock-dominated high-elevation lands and where there is less cover). The ACC/ANPC interpreted CRC's report to suggest that because of mine reclamation activities there would be an increase in pre-berry season habitat in BMSUs 2A and 2B. The ACC/ANPC stated that their analysis did not support that conclusion and in fact showed an increase in 2025 in the best habitat in upper Whitehorse Creek and Rocky Pass, which were not associated with mine reclamation. The ACC/ANPC therefore questioned the accuracy of the figures presented by CRC.

The ACC/ANPC agreed with Parks Canada that the setting of appropriate landscape targets for grizzly bears within a three- to five-year time frame should not be compromised by current and foreseeable activities. The ACC/ANPC stated that setting landscape targets should continue to be supported by all players, industry (including CRC) and government (both federal and provincial) agencies alike.

The ACC/ANPC made the following recommendations with respect to the grizzly bear VEC:

- CRC should ensure that the mitigation measures suggested by its consultant are effectively implemented.

- The logging in BMU 2C should be postponed, possibly indefinitely, to allow for the "no net loss requirement," to improve protection in the critical BMU 2, and to give more protection near Jasper National Park.

- The habitat effectiveness and security area analyses should be reassessed, taking into account more consistent vegetation estimates and increased road fragmentation, OHV usage, and projected industry activity. The integrated resource management (IRM) of these activities should be adjusted accordingly.

- Long-term access management and control and selective road closures within the CEA must be implemented through the IRM plans in order to preserve grizzly bear security areas.

- The Grizzly Bear Research Project should continue to be supported by all players, including industry generally, CRC, and government agencies, both federal and provincial, without compromising its research with premature major activities.

AENV stated that uncertainty remained regarding the effects of potential oil- and gas-related activity and timber harvest in nonapproved forest harvest cut compartments (and associated road development) in the Cheviot CEA study area with respect to the grizzly bear CEA.

AENV said it was important to understand that current grizzly bear cumulative effects models relied heavily on habitat characteristics and that to date scientists had not been able to establish a link between habitat characteristics and population response. In light of this uncertainty, it felt that a more conservative conclusion regarding grizzly bears than that presented by CRC was warranted. AENV felt that the cumulative effects on grizzly bears were significant at both the Project level and in the regional context, but that this would not be expected to impact the status of the grizzly bear provincially. AENV noted that this was the same conclusion it had reached in 1997.

A representative for the Foothills Model Forest provided the Panel with additional information regarding the grizzly bear research program being incorporated into the management decisions arising from the Strategic Framework. The long-term objective of the Foothills Model Forest was "to provide resource managers with the necessary knowledge and planning tools to ensure long-term conservation of grizzly bears in the Northern East Slopes Region." The Strategic Framework outlined the approach proposed to achieve integrated grizzly bear conservation in the Northern East Slopes. AENV noted that the Foothills Model Forest research program planned to link objectives from the Strategic Framework to research activities. The research would then be linked to management activities, which would lead to the practical application of research results. The intent of the research program was to improve the understanding of how grizzly bears respond to a variety of human activities.

AENV noted that a number of important research questions the Foothills Model Forest was trying to answer dealt with bear response to human activities. Many of these questions also related to components of the CEA for grizzly bears. In addition, the Foothills Model Forest was trying to develop and improve techniques used to census grizzly bear populations in order to measure the performance of management actions. Of the five key elements of the Foothills Model Forest grizzly bear research program, three (movements, status and trend, and mortality) were presented to the Panel at the 2000 hearing. AENV noted that the Foothills Model Forest research study area fell within the Strategic Framework area and encompassed the area used for the Cheviot CEA. It further pointed out that 43 per cent of the Foothills Model Forest study area also fell within Jasper National Park, providing a contrast between levels of human land use.

AENV emphasized that the data presented at the hearing were from the first year of a five-year program and therefore not conclusive. Any interpretations presented at the hearing might change

as more data were gathered in the successive years of this program. AENV reported that initial findings showed no significant difference between males and females or between pre- and post-berry season movements. Six home ranges of grizzly bears encompassed a portion of the proposed Cheviot mine site during the period from April to December, and home ranges of some of those bears also crossed the Jasper National Park boundary. AENV also presented data showing grizzly bear movement across the Jasper National Park boundary, as well as the locations of bears relative to habitat types.

AENV reported that the initial results of its DNA analysis indicated an average grizzly bear density similar to historical reports for bear densities in adjacent areas. AENV stressed that while those data were encouraging for wildlife managers, future conservation concerns remained for this species.

Finally, AENV reported that the Foothills Model Forest research program was monitoring known grizzly bear mortality and stated that the issue of road mortality is a major concern. AENV said that in the second year of the program the research group planned to continue tracking bear movements using radio collars, expand the remote-sensing work to measure and track landscape change, develop models to link landscape conditions with populations, and continue efforts regarding population status and trend analysis.

During closing argument, AENV stated that it did not object to the proposed Cheviot Coal Project, subject to CRC's continued compliance with AENV's regulatory requirements for resource management and environmental protection. AENV maintained that the proposed mine was consistent with the provincial government policies for resource management as set out in the Coal Branch Sub-regional Integrated Resource Plan. AENV noted that since the Panel's 1997 report was issued, AENV had undertaken a number of important research and management initiatives, including the establishment of the Whitehorse Wildland Park and a park management planning process. The Coal Branch Access Management Plan was also implemented through a forest land-use zone designation. Regarding grizzly bears specifically, AENV noted that it had actively participated in the development of the Strategic Framework and a related grizzly bear research program.

Weldwood stated in its written submission that after 40 years of forestry development in the region, a healthy grizzly bear population continued to persist in all traditional ranges, including areas with extensive road networks open to human use. In its view, this suggested that grizzly bears were more flexible in adjusting to human activities than the existing cumulative effects model suggested. Weldwood stated that the existing adaptive management process, in conjunction with new knowledge and planning models developed from the Foothills Model Forest research program, provided an excellent safeguard against the demise of the grizzly bear population.

The WCWC stated in its written submission that protection of critical wildlife habitat was essential to the survival of species such as the grizzly bear. It argued that fragmentation caused by continued development in the region was contributing to the endangerment, and possibly the extinction, of species like the grizzly bear.

The WCWC noted that the scientific community regarded grizzly bears as an umbrella species, an indicator of the ecological integrity of an area, because their habitat needs encompass the needs of many other species. The WCWC noted that the main areas of impact on the grizzly bear population were identified by CRC to be increased mortality, habitat alteration, habitat avoidance, and movement obstruction. The WCWC noted that CRC reported significant impacts on grizzly populations at the project level in three of those four areas of impact, and Parks Canada predicted significant impacts on grizzly bear populations at a cumulative level in all four areas of impact. The WCWC believed that grizzly bear populations in the province were in peril and that any further disturbance, be it mortality, loss of habitat, or some other impact, was intolerable.

CNF prepared a section of its written submission on the topic of the ecological integrity of Jasper National Park in relation to the grizzly bear population it shares with the proposed Cheviot Project lease area. CNF revisited the 1997 conclusions of the Panel concerning the ecological integrity of the park in light of new evidence from the Foothills Model Forest Grizzly Bear Research Program.

CNF noted that in its 1997 report the Panel concluded that it did not "believe that the Cheviot Coal Project either on its own or cumulatively, compromises the integrity of Jasper National Park." CNF then turned to evidence provided by Parks Canada in its 2000 submission gathered through the Foothills Model Forest Grizzly Bear Research Program. It observed that the preliminary findings of the grizzly bear research program suggested that bears moved in and out of the national park through mountain passes west of the proposed mine. The mountains did not act as a barrier, as was previously suggested.

CNF stated that it drew several conclusions based on the 1997 Panel report and the subsequent response by Parks Canada to that report, along with recent research findings. First, it concluded that developments adjacent to Jasper National Park, including the Cheviot Coal Project, were having a growing and significant impact on the ecological integrity of the park. Second, the likely increase in human alteration of landscapes for industrial and road development and human activity through recreation was likely to increase the potential for significant mortality risk to grizzly bears. Third, grizzly bears were an important component of the Jasper National Park ecosystem, and the maintenance of ecological integrity demanded the continued persistence of a healthy grizzly bear population.

CNF recommended that the Panel consider not approving the proposed Cheviot Coal Project until such time as the Northern East Slopes Environmental Resources Committee included agreed-upon targets and thresholds in the Strategic Framework. Such targets would, in CNF's view, ensure the long-term persistence of a healthy population of grizzly bears within its current range in the Alberta Yellowhead ecosystem.

The Mountain Cree Camp Syllabics Institute presented evidence regarding potential alternative methods of assessing grizzly bear habitat use through the assessment of bear trails. It suggested that some human/bear conflicts could be avoided if a distinction was made between trails used by

grizzly bears and those used by people and described potential methods, such as the use of synthetic aperature radar (SAR), whereby the existence of such trails could be assessed.

The AWA Coalition noted that the proposed Project fell within the northern half of the provincial Bear Management Area (BMA) 4B. The AWA Coalition also noted the provincial goal of increasing grizzly bear numbers to 1000 and therefore said that increasing bear numbers should also be a goal for BMA 4B. The AWA Coalition pointed out that evidence presented by CRC in 1996 suggested a declining regional grizzly bear population and stated that if the Cheviot development were to proceed, the project-specific and cumulative effects on grizzly bears could be severe and contradictory to the provincial management plan. The AWA Coalition stated that since the grizzly was an umbrella species, the significant cumulative effects would also potentially affect species other than this large carnivore. The AWA Coalition felt that significant uncertainty remained regarding the risk to regional populations of grizzly bears, including those frequenting Jasper National Park, and that the implications for Jasper National Park remained an unresolved concern.

The AWA Coalition stated that it supported Parks Canada's recommendation that the western portion of the CRC mine permit area be protected and maintained as secure habitat. The AWA Coaltion also suggested that the mine permit be removed from the critical wildlife zone and that this area, together with the headwaters of the Cardinal Divide, be added to the Whitehorse Wildland Park with a clear management intent of preservation.

7.3.3 Views of the Panel's Consultants

Vegetation and Botanical Resources

Dr. Ross stated in his submission to the Panel that the analysis for the vegetation and botanical resources VEC met the key criteria for an acceptable CEA. Dr. Peterson commended the analysis for this VEC as, in his view, it provided an excellent overview of the amount of disturbance to mature vegetation expected from various developments between 1996 and 2025.

Elk

During cross-examination, Dr. Ross stated that he would have been reassured about the completeness of the CEA for elk had he seen a clear statement from CRC regarding the assumptions made about forestry, oil and gas, and recreational activity. Dr. Ross said that he had subsequently been reassured that this was the case. Dr. Ross also expressed ongoing concern, however, that the success of the mitigation measures prescribed for most of the VECs, including elk, depended on management strategies that were outside the scope of CRC's control.

Selected Bird Species

Dr. Ross also expressed concern as to whether the impacts of forestry on the selected bird species VEC had been adequately addressed, since, as he noted before, he remained uncertain as to the exact forestry information provided to CRC's consultants at the time of their CEA. He also felt that uncertainty remained regarding the anticipated levels of recreation in the Cheviot CEA area and therefore was concerned that there might be some impacts on bird species that remained unaccounted for. In addition, he found that the amount of oil and gas activity considered for the

CEA of birds was unclear. Despite these concerns, Dr. Ross found that the CEA for selected bird species was reasonably well done and met the key criteria for an acceptable CEA.

Harlequin Ducks

Dr. Ross noted that the Harlequin duck was designated as Yellow (A) status by AENV, due primarily to potential conflicts with recreational user groups. He then pointed out the contradiction apparent in CRC's assessment that the impact of recreation activities on Harlequin ducks was expected to be minimal. He noted that CRC's written submission specific to Harlequin ducks also concluded that recreation activities were presently minimal and were not expected to affect Harlequin ducks in the future. Dr. Ross observed that CRC reported that an increase in recreational activity was expected, but that resource management plans were being developed to mitigate potential impacts of recreation on Harlequin ducks. Dr. Ross stated that given the potential for the growth in recreation and the potential for subsequent impacts, particularly on Harlequin ducks, this aspect of the CEA required more in-depth treatment.

Grizzly Bears

Dr. Ross stated that he found the assessment of grizzly bears for the CEA to be well done. He said that the evaluations of human-use-level monitoring provided by the grizzly bear CEA in order to update the cumulative impact on grizzly bears was a valuable contribution to better environmental impact assessment.

7.3.4 Views of the Panel

The Panel concludes that it has obtained all supplemental information necessary to determine the significance of the impacts of the proposed Project and of the cumulative effects of other reasonably foreseeable development projects within the region on terrestrial VECs. The Panel also finds that the recommendations and proposed mitigation measures outlined in its report of 1997 remain relevant and notes that CRC must continue to adhere to the provincial requirements of that decision, as well as any additional requirements that arise as a result of this Project.

Vegetation and Botanical Resources

The Panel concludes that no significant cumulative adverse effects to the vegetation and botanical resources VEC will occur. **The Panel recommends that the federal government accept this conclusion.**

The Panel accepts CRC's assessment of the potential cumulative effects on vegetation and botanical resources as reasonable and also believes that the evaluation of reasonably foreseeable mining and forestry activity and their potential cumulative effects have been adequately considered. The Panel notes the increase in the level of information exchange between Weldwood and CRC since the last hearing and believes that this improvement in communication will allow both companies to significantly reduce the collective impact of their activities. The Panel, through the EUB, will work with AENV to ensure that this high level of cooperation and coordination continues. As a result, the Panel concludes that no significant adverse cumulative effects on vegetation and botanical resources are expected to occur from either regional mining or forestry operations in association with the Cheviot Coal Project.

The Panel notes that two of the key issues in *Decision 97-8* were the impacts to old-growth forest in the vicinity of Powerhouse Creek and the potential impacts to alpine vegetation in upper Prospect Creek. The EUB addressed the latter issue in *Decision 97-8* by excluding that portion of the mine lease from development. With regard to the first issue, the Panel agrees that the additional surveys by CRC now indicate that the potential loss of 29 ha of old-growth Engelmann spruce-subalpine forest vegetation in the Powerhouse Creek area is not significant at a regional level, as old-growth forests were found to be generally more abundant and secure than previously thought. The Panel continues to believe that CRC's mitigation strategies, combined with the approaches proposed to be used by Weldwood in its forestry management practices, will adequately address these impacts and therefore no significant cumulative adverse effects to these vegetative resources will occur.

The Panel also concludes that the effects of oil and gas activity and recreation on vegetation and botanical resources will also not be significant on a regional scale. The Panel notes in particular that on Crown lands in the province there is already good coordination between the road construction needs of the oil and gas industry and the forestry industry. This will reduce the risk of duplicative roads being constructed and further reduce the risk of impacts from oil and gas developments.

The Panel also notes that the mitigation measures set out in the earlier decision are generally consistent with the recommendations made by the various interveners at the reopening of the hearing. The Panel will ensure that these requirements continue to be captured in any new provincial approvals.

The Panel does remain concerned that the probability of success of transplanting rare or unique plant species, one of the mitigation measures proposed, may not be high. In addition, in the absence of ongoing surveys, there is a reasonable likelihood that additional rare species that might exist within the mine site would be overlooked. Therefore the Panel will, in conjunction with AENV, the agency responsible for site reclamation, require that monitoring of rare and valued species continue and that CRC also closely monitor and report regularly on the success of valued plant species transplants. Other methods to safeguard the rare plant populations, such as seed collection and storage, must also be considered as a backup to augment the uncertain outcome of transplants. If these mitigation strategies are followed, the Panel believes that any significant adverse impacts to rare plant species will be avoided.

Elk

The Panel concludes that both project-specific and cumulative impacts on elk from the range of expected development activities in the region considered in the CEA will be of a minor nature and not significant. **The Panel recommends that the federal government accept this conclusion.**

The Panel notes that while some components of CRC's assessment were questioned at the hearing, the other participants to the hearing, including the Panel's consultants and the government experts, generally did not challenge this conclusion.

The Panel found in its earlier decision that elk, while clearly an important component of the regional ecosystem, are not particularly vulnerable to the types of disturbance associated with mine development. It appears likely to the Panel that with the absence of hunting on the mine site and surrounding region due to restricted access and through the use of agronomic species in CRC's reclamation programs, elk populations within the CEA study boundaries may in fact benefit. The Panel notes that CRC should be cautious when implementing reclamation techniques for the purpose of ameliorating elk habitat, so that efforts to improve forage or cover for elk do not conflict with revegetation of native species or attract grizzly bears to unsuitable areas.

The Panel notes that among the mitigation measures for elk recommended by CRC's consultant was the implementation of slowdown zones along roads where there is known wildlife use and the development and maintenance of a mortality database. This mitigation measure also coincides with mitigation measures recommended for the selected bird species and the grizzly bear VECs. The Panel will expect CRC to ensure that this measure is implemented in a timely manner in those areas under its control.

The Panel notes that the success of mitigation for elk relies in part upon effective wildlife mitigation actions by other industrial developers in the region. The Panel is satisfied that the various regional planning initiatives being carried out by the province, in consultation with industry and the federal government, will ensure that wildlife management in the region is closely tied to the monitoring of the success of those industrial mitigation plans. The Panel expects that the industries that are regulated by the EUB will continue to be active participants in those planning processes.

Selected Bird Species

The Panel concludes that while cumulative impacts to various bird species through losses in habitat will occur in the region, these impacts will be small or readily mitigable using existing techniques and planning processes, so that any adverse effects are insignificant. **The Panel recommends that the federal government accept this conclusion.**

The Panel is satisfied that the applicant considered all of the relevant expected mining and forestry developments when assessing the potential cumulative effects on the selected bird species VEC and that this evaluation of cumulative effects was consistent with the methods used for other VECs. The Panel also concludes that the impact of regional oil and gas and recreational development on bird populations is likely to be minimal.

The Panel notes the difference in views between CRC and Environment Canada with respect to the numbers and types of species that should have been selected for analysis in the CEA. Environment Canada suggested that in order for the CEA to be complete, CRC should have assessed the potential impacts on all of the neotropical migratory bird species expected to make use of the CEA study area rather than focusing on a selected group of species. Only after such an analysis would CRC be able to assess the total potential impact on this group of species. Environment Canada argued that even if a species was common within the region, it was

important to understand population trends for the species on a continental scale in order to assess the magnitude of the impact of further habitat loss.

Environment Canada's position appears to be based on the fact that on a continental basis there have been significant declines in the populations of a number of bird species, particularly neotropical migrants, with many of these reductions tied to loss of habitat. Because these habitat losses were individually small but collectively significant, it was important that any habitat losses from CRC's proposed development be considered in this light.

CRC in its submissions did not appear to take exception to the position by Environment Canada regarding the importance of ensuring that neotropical migrants were adequately protected. CRC indicated that the approach to CEA for the selected bird species VEC advocated by Environment Canada if carried out would have been actually less comprehensive than the approach used. CRC noted that while there was some overlap in the species that would have been considered in the two approaches, in its view, its assessment included a broader range of species with more national and regional significance. CRC also noted that its selection process was based on more data sources and in particular on data from bird surveys carried out within the region.

The Panel can understand Environment Canada's concerns regarding the international loss of wildlife and its desire to ensure its protection. However, in comparing the results of the analyses carried out respectively by CRC and Environment Canada in terms of the issues that the Panel must address, there appears to be relatively little difference. In fact, Environment Canada came to a similar conclusion, i.e., that both methods would tend to lead to a similar finding with respect to the significance of Project impacts on birds. Both reviews confirm that the Cheviot mine site and the surrounding region contain a rich avifauna. Both indicate that the risk to some species is higher than others due to a number of factors, including the amount and availability of habitat that may be lost. Perhaps the greatest difference is the interpretation of the relative importance of these impacts on a continental scale. However, both reports indicate that many, if not all, of these impacts can be avoided through ongoing adaptive management and the protection of certain habitat types. Since this is already a requirement for CRC, the Panel believes that the conclusion that the risk of cumulative impacts to these species will be insignificant is a reasonable one.

At the hearing, Environment Canada went on to suggest that it also believed that there was a strong need for additional research throughout the boreal forest regions of Canada on neotropical migrants. While it confirmed that this research did not need to be completed before the Cheviot Coal Project was considered, it did believe that this should be carried out before future developments were approved. While the Panel is certainly supportive of any research that will help to ensure that future impacts are addressed, the Panel believes that the second issue raised by Environment Canada is beyond the Panel's mandate. **The Panel recommends that the federal government confirm, in a timely fashion, its position with regard to Environment Canada's request for additional research into the effects of industrial development in the boreal forest ecosystem on neotropical migrants.**

Harlequin Ducks

In its earlier report, the Panel observed that while it believed that the McLeod River Harlequin duck population was regionally important, it was also of the view that additional survey work would likely determine that Harlequin ducks were more widespread than previously thought. Since the release of that report, there has been a significant amount of new research carried out into Harlequin duck distribution and population size in Alberta, confirming that although patchy in distribution, there are a number of regional populations in the province. In its initial report, the Panel concluded that some adverse effect on Harlequin populations would be experienced within the Cheviot mine site. The Panel also concluded, however, that with the proposed mitigation measures, including ongoing monitoring, these adverse effects would be insignificant.

The Panel believes that these conclusions continue to be well supported by the new data now available and continues to believe that adverse effects on Harlequin ducks will be insignificant. **The Panel recommends that the federal government accept these conclusions.**
The Panel does note that this prediction is largely dependent on the success of the mitigation measures proposed by CRC. The Panel continues to believe that there is a need to closely monitor the effects of the proposed mine on all Harlequin duck life history stages (i.e., nesting, brood rearing, staging) and will require CRC, through its EUB approval, to meet its commitments in this regard.

Resource management plans being implemented in the region are seen by the Panel as tools that should also mitigate impacts on Harlequin ducks in the future. The Panel notes that the evidence suggests Harlequin ducks may be particularly vulnerable to the effects of recreation. CRC made a number of suggestions for the management of Wildhorse Wildland Park with regard to trail and campground locations, random camping, and public education. These could be incorporated into the Wildhorse Wildland Park draft management plan to help further reduce regional impacts to Harlequin ducks. **Given the regional importance of the Maligne River Harlequin duck population in Jasper National Park, the Panel would also strongly recommend that Parks Canada ensure that its management of this population, given the high levels of recreational activity within the Park, is integrated into and consistent with the broader regional planning process.**

The Panel notes the overall acceptance by AENV of CRC's analysis of potential impacts on Harlequin ducks. However, AENV also noted that ongoing monitoring was required. The Panel adds that any management actions taken by CRC must incorporate the findings of all regional initiatives focused on Harlequin ducks, including results of the Foothills Model Forest research examining the relationship between hydrologic features and Harlequin duck presence.

The Panel considered the position presented by Dr. Ross that the impacts of recreation on Harlequin ducks should receive a more in-depth examination and the subsequent summary of the impacts of recreation on Harlequin ducks and potential remedies to those impacts provided by CRC (Exhibit 321). The Panel notes that most of the concerns and recommendations relate directly to the effective drafting and implementation of the Wildhorse Wildland Park management plan and an associated access management plan. In addition, careful monitoring and adjustment to angling restrictions in Harlequin duck habitat appear to be necessary.

While CRC retains responsibility to continue its participation in regional Harlequin duck studies, the Panel believes that the onus is on AENV to ensure that results of research and monitoring programs are being effectively implemented. As noted earlier in this report, the Panel believes it has been provided with substantial evidence that the provincial government has been and intends to continue ensuring that these regional concerns are addressed. As a result, the Panel concludes that current provincial management plans will ensure that adverse impacts from recreation on Harlequin ducks are insignificant. **The Panel recommends that the federal government accept this conclusion and be prepared to actively support and participate in these management programs, including providing funding, to ensure their success.**

The Panel notes that Justice Campbell visited the issue of Harlequin duck habitat destruction through the disposal of waste rock ("rock-dumping"). He stated that, based on the Panel's 1997 report and the evidence provided by Environment Canada, "the issuance of Fisheries Act authorizations for the proposed mine operations will result in the deposit of harmful substances in areas frequented by migratory birds. Thus, the actions of DFO will be 'contrary to law' (Section 35 of the *Migratory Birds Convention Act Regulations*) and subject to judicial review." Justice Campbell did not, however, make a specific ruling with respect to this issue. The Panel believes that it adequately addressed the potential direct impacts of the Cheviot Coal Project on birds and bird habitat in its original report and has also addressed the cumulative effects of the Project, in association with other reasonably foreseeable developments, in this report. The Panel believes that the questions associated with the specific nature of any federal approvals required for the Cheviot Coal Project are beyond the authority of the Panel to address. **However, given the importance of these issues, the Panel recommends that the federal government, in its response to this report, confirm how it intends to respond to the issues raised by Justice Campbell.**

Grizzly Bears

The Panel continues to believe that the ongoing viability of grizzly bear populations in the region represents an excellent measure of the success of a range of ongoing management initiatives. In this case, the Panel believes that CRC's efforts to predict cumulative impacts on grizzly bears in the CEA study area were thorough and carried out with a high degree of scientific rigour. The Panel finds that CRC has contributed substantially to research efforts and understanding of the regional grizzly bear population. The Panel particularly notes the efforts made during the hearing to extrapolate potential oil and gas and forestry activity and its cumulative effects on linear development and, by association, grizzly bears. The Panel also recognizes CRC's contribution to the ongoing grizzly bear research program and the Strategic Framework.

The Panel notes that while CRC concluded, as a result of its research, that its earlier predictions with regard to the impacts of its Project on grizzly bears were perhaps too conservative, the company did believe that the risk of cumulative effects on grizzly bears in the region remained high. AENV, however, argued that a more conservative conclusion regarding the cumulative effects on grizzly bears was still warranted. Both AENV and Jasper National Park took the position that the cumulative effects on grizzly bears might be significant at a project level as well as in a regional context. AENV did not expect that the provincial status of grizzly bears would

change, however, while Jasper National Park was of the view that even without the Cheviot Project, significant cumulative impacts to bears may occur as a result of other forms of regional development.

The Panel generally agrees with AENV's view in this regard. While the Panel acknowledges the strong technical base to CRC's assessment, ultimately that view is dependent on the results of primarily modelled rather than empirical data. The Panel believes that, given the uncertainties associated with any ecological model, it is better to apply more rather than less conservatism to the results. The Panel also notes that the success of the Strategic Framework is considered critical to achieving a healthy grizzly bear population, but that the successful implementation of such a framework will likely require time to perfect. If the Strategic Framework is not successful, CRC's own consultants anticipate that the regional grizzly bear population will decline. The Panel therefore confirms its original conclusion that without mitigation the Cheviot Coal Project will result in significant adverse effects on grizzly bears. The Panel also concludes that without mitigation there is a significant risk of regional adverse cumulative effects with or without the Project.

The Panel believes that Parks Canada's relatively speculative prediction regarding the likely future for grizzly bears in the region, while it could occur, is overly conservative. The Panel notes that AENV has the responsibility for the management of provincial grizzly bear populations and that AENV has initiated, often in consultation with Parks Canada, a number of regional initiatives to address cumulative impacts on bears in the region. The Panel is comfortable, based upon the available evidence, that these initiatives are proceeding in a timely fashion.

In its 1997 report, the Panel stated that it believed that CRC's proposed Carnivore Compensation Program could, if successfully implemented, provide adequate regional mitigation for site-specific impacts to grizzly bear populations. The Panel notes that since the issuance of the report, the Strategic Framework has been developed. This program, and all of the various associated research being carried out, now appears to provide an even more significant opportunity to provide for regional mitigation of the cumulative effects on grizzly bears. As a result, the Panel concludes that the potential adverse effects of the Cheviot Coal Project can be mitigated through regional planning and implementation of the Strategic Framework.

Given the rate of development within the region, the Panel's original concern with the rate of implementation of the Strategic Framework does still remain. At the same time, the Panel is particularly pleased that both levels of government, as well as a number of industry players, including oil and gas, other mining interests, and forestry, are now directly involved in its design and implementation. Therefore, while the Panel reconfirms its original requirement that CRC must be able to demonstrate the successful implementation of a regional program to adequately address impacts on grizzly bears within three years of Project approval, the Panel is also more confident that this goal will be achieved.

The Panel is also convinced that the establishment of realistic management targets and threshold values is key to the success of the Strategic Framework. The Panel concludes that the values for landscape condition indicators cited as working hypotheses in the Strategic Framework are

suitably conservative until more set values can be determined within the expected planning window. The Panel therefore supports the interim use of these working hypotheses by resource managers and land-use planners. The Panel notes that CRC must confirm within three years a plan to address regional impacts on grizzly bears. The Panel would be prepared to accept the establishment of threshold values as a suitable measure of successful implementation of a regional mitigation program.

The Panel recommends that the federal government accept the mitigation requirements set out for CRC and the undertakings of AENV as acceptable mitigation for the adverse effects of the Cheviot Coal Project on the grizzly bear VEC.

The Panel also recommends that the Government of Canada be prepared to actively participate in any research into the impacts of area development on wildlife in the region.

The Panel notes that CNF recommended that the Panel consider not approving the proposed Cheviot Coal Project until such time as the Northern East Slopes Environmental Resources Committee approved a Strategic Framework containing agreed-upon targets for indicators. Such targets would, in CNF's view, ensure the long-term persistence of a healthy population of grizzly bears within its current range in the Alberta-Yellowhead ecosystem. However, as the Strategic Framework has also provided working hypotheses until such time as more definitive thresholds and targets can be established, the Panel is prepared to accept that these are an acceptable and practical approach to the near-term management of grizzly bear habitat in the Yellowhead region. The Panel notes that it has tied CRC's approval to the successful implementation of the Strategic Framework. The Panel believes that this will also help to address the concerns of the AWA Coalition regarding ensuring that development does not result in a decline in the regional grizzly bear population, contrary to provincial management goals.

In the 1997 Panel report, concern was conveyed regarding the potential blockage of carnivore movements from Jasper National Park to provincial lands, as well as the need to ensure that bear populations on the border of the park remain viable. In considering this issue, the Panel was struck by, on the one hand, the high quality of the upper Cardinal River habitat for carnivores and, on the other, by the relatively low habitat effectiveness of the region based on the CEA models, due apparently to road development and OHV use within the valley. No evidence was presented at the 2000 hearing to alter the Panel's view in this regard, and the Panel asks that AENV consider the effectiveness of the access management plan implemented in this area. Further detail is provided in Section 8.

Since the release of *Decision 97-8*, the Panel notes that the Government of Alberta has created the Whitehorse Wildland Park. The Panel believes that this should serve to some degree as a buffer between the Cheviot development and Jasper National Park. The Panel also notes the high-quality habitat in both the pre-berry and berry-and-after seasons for grizzly bears in BMSU 2A both in 1999 and in 2025, as well as the linkage zones created by mountain passes between Jasper National Park and the Whitehorse Wildland Park. In light of this evidence, the Panel believes that there likely remains a need for the provincial park management plan to include specific measures aimed at securing effective habitat for grizzly bears. The Panel

encourages those developing the Whitehorse Wildland Park management plan to give special consideration to issues regarding access management. The Panel believes that this should be given priority so the necessary management plans are put in place as early as possible in the process of developing the Cheviot mine. Information gleaned as part of the various studies into regional bear population behaviour should of course be incorporated directly into these plans as well.

As noted earlier, the Panel remains convinced that the grizzly bear is an excellent indicator of landscape integrity and therefore a suitable VEC for consideration in this assessment. Furthermore, the Panel believes that if ecological integrity for grizzly bears is maintained, it is very likely that impacts to other carnivores will also be kept at acceptable levels. It is suggested, however, that a more comprehensive carnivore compensation strategy also be considered to account for other species such as fisher or lynx. The Panel expects that this program can be developed as one component of the other regional plans under way, again preferably within the next three years.

7.4 Public Access—Recreation

CRC addressed two VECs in its CEA directly related to regional social issues. These were public access-recreation and traditional use. Interveners, including government experts, appeared to generally support this selection of community VECs, with a specific request that the CEA needed to consider the effects of the displacement of recreational activities in both a local and regional context. The public access-recreation VEC is addressed below, while traditional use is addressed in Section 9 of this report.

7.4.1 Views of the Applicant

CRC concluded that development of the Cheviot mine, in combination with other projects and activities in the region, would not have a significant cumulative effect on public access for recreation. This conclusion was based on the belief that the regulatory framework and protection plans for other mines, forestry, and oil and gas would ensure that any impacts on recreation would be mitigated. For example, CRC noted its direct experience that the requirements for mitigation of any impacts on recreation are routinely addressed as part of the approvals process for new and expanded mine developments. CRC believed that future forestry development, including the construction of a main forestry road for the Pembina River-Grave Flats area, would result in additional opportunities for OHV and snowmobile access to the east of the Project, subject to access management strategies to be developed in consultation with regional land managers and public stakeholders. In the case of petroleum and natural gas development, CRC believed that future development in the region would be located at some distance from the proposed mine site and would therefore have no effect on public recreation.

CRC also believed that any future impacts on recreation arising from the Cheviot mine and/or other projects or activities could be dealt with adequately using existing regional management mechanisms. It noted that in the 1997 decision report, the Panel concluded that without some form of regulatory control, recreational activities displaced by the Cheviot mine could compromise other land-use objectives, including the preservation of ecological values in the Cardinal Divide Natural Area. CRC noted that with the establishment of the Coal Branch Forest Land Use Zone and the Whitehorse Wildland Park in 1998, appropriate mechanisms to manage public access and recreation in the vicinity of the proposed Cheviot mine were now in place. CRC also confirmed its plans to continue its involvement on the Coal Branch Access Management Advisory Committee and on the Whitehorse Wildland Park Advisory Committee.

CRC concluded that the proposed mines would have no cumulative impacts on access to and enjoyment of Jasper National Park, the Cardinal Divide Natural Area, the Cadomin Caves, or the Whitehorse Creek Campground. For the Mountain Park staging area and cemetery, the Grave Flats Road, designated motorized trails, and nondesignated (random) camping sites, CRC concluded that cumulative impacts on public access for recreation would be minor, short term, and reversible. To help mitigate the potential adverse effects associated with closure of the Mountain Park OHV staging area, CRC indicated that it was working with AENV to identify an alternative staging area, but a suitable location had not yet been identified.

7.4.2 Views of the Interveners

Several interveners questioned CRC's predictions about where future recreational activities were likely to occur in the region once the mine was developed and expressed concerns about the resulting impacts on the landscape. The ACC/ANPC suggested that closure of the mine area to random camping and other activities would displace the current recreationists using the area and would result in increased use of Whitehorse Creek, right up to Fiddle Pass. It noted that the Whitehorse Creek drainage offers significant habitat for both grizzly bears and Harlequin ducks, both of which are susceptible to human intrusion. The AWA Coalition expressed similar concerns about how recreational users displaced from the mine site might affect the viability of grizzly bear populations.

A second concern related to how mining and other activity in the region might affect patterns of OHV use. Several interveners questioned CRC's assumption that closure of the Mountain Park staging area would most likely displace OHV users to areas east of the mine. The ACC/ANPC stated that it was concerned that OHV use may actually be displaced west into the Cardinal River headwaters and Rocky Pass. It noted that increased OHV use of this area could have a significant impact on grizzly bears and other species and pointed out that the continued integrity of this area as wildlife habitat was a key assumption in the analysis of cumulative effects for several VECs. The ACC/ANPC provided photographic evidence showing the cumulative effects of OHV usage in selected parts of the Cardinal headwaters since 1993. As a solution, it suggested that the Cardinal headwaters be closed to OHV use and that this area, right up to Rocky Pass, also be designated as a part of the Whitehorse Wildland Park. Other interveners, including Mr. Mitchell, supported this concept.

The ACC/ANPC also argued that the present mechanisms for managing recreational access in the region were not effective. It was concerned that the recent creation of the Coal Branch Forest Land Use Zone has in fact served to attract more OHV use of the area and noted that some illegal OHV use is still occurring, presumably because of lack of education and enforcement. The ACC/ANPC suggested that a more proactive approach for managing recreation should be adopted. For example, it noted the recent proliferation of random campsites throughout the area and suggested that action be taken to establish specific areas for OHV use away from the areas used by people engaged in nonmotorized activities. The ACC/ANPC further noted that the demand for facilities by all recreational users displaced by the mine could exceed the capacity of the existing campgrounds but at present there were no specific plans to build additional facilities in the area. Without the development of additional facilities at specific locations away from key wildlife areas, the ACC/ANPC strongly believed that proliferation of random campsites and their associated problems would continue.

AENV summarized its current enforcement activities and noted that it would be increasing its enforcement activities in the region. It acknowledged, however, that its resources for monitoring and enforcement were limited. AENV indicated that if OHV use of the area affected by the mine was further restricted, it was possible that OHV users could leave the area altogether because areas east of the mine site were less attractive. AENV confirmed that the Coal Branch Access

Management Advisory Committee and the Whitehorse Wildland Park Advisory Committee would continue to manage recreational activities in the region. AENV also noted that it was working with Weldwood on a long-term access management plan for the company's FMA.

7.4.3 Views of the Panel

In its 1997 report, the Panel concluded that the cumulative effects of the Cheviot Coal Project on recreation in the region could be significant. The Panel also recognized that such impacts could be reduced through the establishment of acceptable alternative recreational opportunities and through stronger regulatory control of access by land managers. The Panel believes that the establishment of the Coal Branch Forest Land Use Zone and the Whitehorse Wildland Park since 1997 provides two concrete examples of increased regulatory control that directly address the Panel's original concerns.

Despite these recent regulatory initiatives, the Panel remains concerned that the impacts of the Cheviot mine, in combination with other development in the region, could still have a significant cumulative adverse impact on recreation in the area. CRC has indicated that development of the mine will dislocate a considerable amount of recreational activity, and the Panel concludes that unless more measures are taken to proactively and systematically relocate these people to other sites, there is a significant risk that growing demand for recreation is this area will have undesirable impacts on the landscape and its ecological resources.

The Panel commends CRC for its commitment to continue its participation on the various advisory committees and is encouraged by AENV's efforts to develop access and recreation management plans for the region. However, the Panel concludes that additional efforts are required to manage the Project's impacts on recreation.

The Panel will require that CRC continue discussions with AENV to find a replacement staging area for OHVs, and include regional representatives of OHV associations and other recreational groups in these discussions. The Panel believes that the success of such an initiative will eventually be critical to the company's meeting its other obligations to protect key ecological values, including regional grizzly bear populations. The Panel encouraged the development of such a site in its original decision, noting that the McLean Creek site in Kananaskis Country has been successful in resolving conflicts with OHV use in southern Alberta. The new staging area should be established preferably before the Mountain Park site is closed, so OHV enthusiasts will have alternative facilities. This replacement site should be selected so that OHV use will not jeopardize key regional environmental objectives, such as those related to grizzly bear habitat, and to minimize conflicts with nonmotorized recreation.

The Panel also strongly believes that the headwaters of the Cardinal River should be considered for additional protection. One possibility would be to incorporate it into the Whitehorse Wildland Park so that more intensive management controls can be placed on recreational and other users of the area. Evidence before the Panel suggests that Rocky Pass and other passes through the front ranges of the Rocky Mountains are extensively used by grizzly bears. If this population is to be maintained in light of the cumulative effects of proposed developments, human disturbance of

these headwater areas needs to be managed. The Panel again reiterates its belief that this step would go a considerable way towards the successful mitigation of impacts on a number of VECs, including carnivores, in the region.

The Panel concludes that with the implementation of appropriate mitigation, the adverse effects of the Cheviot Coal Project on recreation, including cumulative effects, will be insignificant. **The Panel recommends that the federal government accept this conclusion.**

8 ACCESS MANAGEMENT

From the foregoing sections it is clear that many of the cumulative impacts to the regional environment are due to the development and use of linear developments such as seismic lines, utility rights-of-way, and roads. Industry creates these linear disturbances to gain access to resources. The public uses them for recreational access. Over time, the number of access routes has proliferated and the number of people using them has grown, placing stress on the regional ecosystem.

All participants who spoke about access at the hearing recognized the need for its management if impacts were to be minimized. The Panel believes that the management of both the development and use of access will significantly influence the potential success of regional resource management initiatives and project-specific mitigation of cumulative effects. In reaching its conclusions regarding the proposed Cheviot Project, the Panel believes it must determine whether the access-related cumulative effects of the Project are acceptable. In doing so, the Panel intends to have regard for the regional cumulative effects of access as well as for the concerns about the impacts of access at particular locations near the proposed mine.

8.1 Views of the Applicant

CRC stated that it understood the importance of managing access as a means to mitigate the adverse cumulative effects of industrial development and recreation in the region. Although access affects many aspects of ecological integrity, the litmus test in the eastern slopes, CRC said, was the effect of human access on the survival of the large carnivores, particularly grizzly bears. Mr. Kansas, on behalf of CRC, quoted the well-respected grizzly bear biologist Dave Mattson:

> Management of human access is currently viewed by most managers - I would say all managers, pretty much, that are worth their salt - as the most critical element of grizzly bear habitat conservation.

Mr. Kansas also said:

> ...it's very clear from the grizzly bear scientific literature that direct human-caused mortality is the cause of virtually all grizzly bear population declines in North America and that human access is the primary mediator of that mortality.

CRC presented an analysis of current and extrapolated future road densities in order to estimate the potential cumulative impacts of access development in the regional cumulative effects study area. The modelled scenario extrapolated oil and gas, forestry, and recreational access to the year 2025. CRC concluded that, for grizzly bears at least, road densities were currently below the threshold densities employed in other regions. In the future, however, unless road densities were actively managed through shared access and selective road closures, these thresholds could be breached. CRC also urged caution against uncritically adopting threshold values from other regions and stressed the need for site-specific verification through the Foothills Model Forest

grizzly bear research program. Finally, CRC concluded that the proliferation of human use in the region could be a serious problem if not properly managed within the next five years.
CRC stated that it hoped to minimize the impacts of access development by coordinating its activities with other industrial users of the region. Dr. Hererro, on behalf of CRC, said that the proposal to coordinate access among industrial users would require both regulatory agencies and industrial users to adopt a somewhat different approach to land use than they have had in the past.

8.2 Views of the Interveners

AENV noted that the level of public use in the area was increasing, but that this in itself was not a concern. AENV cited the many tools available to deal with the effects of public access, including multiple-use corridors, joint-use roads, timing constraints, gating, and removal of drainage structures and bridges prior to final reclamation. AENV noted that although maps of the CEA study area gave the appearance of a proliferation of roads and trails on a severely impacted landscape, many of these roads and trails might be impassable for some or all types of vehicles. Furthermore, it said, a number of groups were already dealing with access management. AENV stated that it and Weldwood were working together on a long-term access management plan for the company's FMA. Other groups, including the Northern East Slopes Environmental Resource Committee, the Yellowhead Ecosystem Working Group, the Model Forest, the Coal Branch Access Management Committee, and the Whitehorse Wildland Park Advisory Group, were also addressing access among other matters. AENV, in response to comments from the ACC/ANPC, agreed that resources available to enforce existing access restrictions were limited, but said that despite these limitations, more would be done to enforce the Coal Branch Forest Land Use Zone in the future.

The ACC/ANPC said that faulty assumptions used by CRC in its projections of road densities and usage had led the company to underestimate the regional impacts of both. The ACC/ANPC noted that CRC's human-use feature maps appeared to depict practically no changes in the road densities between 1999 and 2025 and no discernible changes in their use status. Forestry road projections were only shown to 2008, even though the map was labelled "projection to 2025." When additional evidence was tendered during the hearing to fill that gap, the ACC/ANPC noted that the estimated amount of linear disturbance increased by about 200 per cent, or another 1000 km of roads, with obvious implications for the CEA.

The ACC/ANPC stated that the claims that OHV users were restricted from the Whitehorse Wildland Park were incorrect and noted that there were frequent violations of the access limitations of the Coal Branch Forest Land Use Zone. The ACC/ANPC observed that many users of the area were ill informed or misinformed about restrictions placed on public access, and it believed that the government must do more to educate area users. The ACC/ANPC noted that the lower Prospect Creek trail, which is designated for horses and hikers only in the access management plan, is mistakenly shown as an OHV route on maps currently in circulation. The ACC/ANPC also noted that AENV had few resources at its disposal to educate, monitor, and enforce restrictions on vehicle access.

The ACC/ANPC recounted how the Cardinal River headwaters, once designated Zone 1 (prime protection) was redesignated Zone 4 (general recreation) under the access management plan to allow use by OHVs. As a result, the ACC/ANPC observed, the headwaters had become a designated area for off-road vehicle use. It was the belief of the ACC/ANPC that the temporary designation was to have been for a limited trial period, after which the headwaters were to have been closed if the trails were damaged. The ACC/ANPC claimed that the recreational use of motorized vehicles had heavily abused the area and provided photographs to document the damage. In light of this evidence, the ACC/ANPC said, the area should be immediately rezoned as prime protection under the Coal Branch Forest Land Use Zone.

The ACC/ANPC also believed that the area from Grave Flats Road where it meets the Cardinal River across to Mount Mackenzie and west to Jasper National Park should be included in the Whitehorse Wildland Park as soon as possible. The ACC/ANPC commented that the concern expressed in 1997 by the Panel over the potential displacement of motorized recreation into the Cardinal River headwaters was all the more acute now that the only designated OHV trail in the area was up the Cardinal River headwaters. The ACC/ANPC urged an immediate prohibition of motorized vehicle access to the Cardinal River headwaters from the Grave Flats Road.

In addition to its specific recommendations for the protection of the upper Cardinal River watershed, the ACC/ANPC proposed a number of recommendations with respect to access management in the region. It stated that road development and access management must be part of a "whole integrated system design." The Panel, it believed, should remind the province of the need for a regional access management plan and for government-directed regional integrated resource management plans to ensure that cumulative effects of industry and other activities do not exceed sustainable levels.

The AWA Coalition stated that it shared many of the ACC/ANPC's concerns and recommendations, noting that the area slated for OHV use included all of the critical wildlife zoned lands in the cumulative effects study area. The forest land-use zone designation, it said, had the potential to make the area south of Cadomin, including the Cardinal headwaters, a provincial destination for OHV use. The net effect had been to increase motorized recreation in the area, not to reduce it, as was recommended by the Panel in 1997. The AWA Coalition stated that, in its view, motorized vehicle access in this area threatened high-quality grizzly bear habitat and that in the absence of regular monitoring and enforcement, OHV intrusions into Jasper National Park and the Wildland Park were to be expected.

Parks Canada questioned the completeness of the linear disturbance data and the assumptions employed by CRC in its projections of linear disturbance densities. In particular, Parks Canada said that forestry road development was underestimated, OHV use of trails was downgraded, and the expected displacement of recreational vehicles from Mountain Park to the upper Cardinal area was not included in the CEA.

Mr. Clark stated that he was looking forward to improved access to the Cardinal Divide if the road were upgraded. He expressed the view that this would be a benefit.

The AFN noted that the upgrading and paving of Highway 40 would increase levels of human activity during and after the life of the mine. It questioned the value of upgrading the Graves Flat Road to 90 km standards, noting that speeds greater than 60 km were associated with increased wildlife mortality.

8.3 Views of the Panel's Consultants

Dr. Peterson expressed two concerns with respect to the access information provided by CRC. The first was whether the Panel could rely on estimates of road construction rates if the forestry plans before them were not current. Weldwood later resolved this issue by providing its most current draft management plans. Second, he asked whether Weldwood's road construction plans, particularly in compartments 316 and 317, would be altered by an approval of the Cheviot mine. Weldwood, in response, indicated that an approval of the Cheviot Project would not affect road-building schedules up to 2025.

Dr. Peterson noted that the 1996 Weldwood Harvest Planning and Operating Ground Rules called for a stewardship report to be submitted annually and to be made available to the public. The stewardship report required Weldwood to produce a road management plan as part of the annual operating plan, identifying all roads that were active, constructed, maintained, or reclaimed during the year. The company was also required to maintain a road management catalogue summarizing the status of each active road in the FMA. This record keeping, Dr. Peterson said, along with data from other industrial users in the area, may be an underutilized resource that could be employed to manage cumulative effects in the region.

As noted earlier in this report, Dr. Ross indicated that he was concerned as to whether the assumptions made with respect to access were consistent among the component VEC analyses. He also stated that he was pleased to see that CRC had recognized the need to manage the cumulative impacts of access on a regional basis and appeared to be willing to collaborate with regulators and other resource users to this end.

8.4 Views of the Panel

In the Panel's view, two aspects of access management are relevant to its mandate in reaching appropriate conclusions and making recommendations with regard to the proposed Cheviot mine. First, the Panel must have an adequate understanding of current access in the region and its use by industry and the public against which to assess the impacts of the Project. Second, the Panel must determine whether approval of the Cheviot mine would alter the likely future regional access patterns and whether any resulting potential cumulative adverse effects were significant.

In its 1997 report, the Panel concluded that careful access management would be required to avoid significant impacts on regional land-use objectives and ensure the success of CRC's mitigation programs for wildlife. In its EUB capacity, the Panel placed two conditions on its approval of the Cheviot mine to mitigate access-related impacts. The first required CRC, in consultation with AENV and ACC/ANPC, as the stewards of the Cardinal Divide Natural Area, to ensure that no access points were created into the Cardinal Divide Natural Area. The second condition required CRC to monitor changes to public access and use patterns resulting from the

development and to advise AENV if any of these appeared to unduly increase wildlife mortality or damage wildlife habitat. The Panel concludes that these two conditions continue to be relevant and will ensure that they are extended into any new approvals issued by the EUB.

At the recent hearings, the Panel heard that a number of circumstances surrounding the proposed Cheviot mine site have changed since the original public hearings. Foremost among those changes were the designation of the Whitehorse Wildland Park and the creation of the Coal Branch Forest Land Use Zone. In the Panel's view, these land-use designations should eventually result in better access control for the areas immediately surrounding the proposed mine. Evidence before the Panel at the present time, however, suggests that neither has as yet produced a marked positive effect in curtailing the damaging effects of OHVs on wildlife habitat or on backcountry trails.

In the Panel's opinion, the lack of clear positive results thus far does not mean that the land-use controls enabled by these designations cannot achieve the required level of access control in the mine's vicinity. The Panel remains confident that they are the beginnings of the right approach. However, it is clear that much remains to be done to ensure effective access management. It also means that the Panel cannot accept CRC's assessment of the residual impacts of the proposed Project without some further assurance that the adverse impacts of access can be effectively managed.

The Panel notes that the draft management plan for the Whitehorse Wildland Park is currently in preparation. The Panel believes, based on the presentations by the provincial regulators at the hearing, that the access management provisions of that plan will include an objective of mitigating the impacts of the proposed Cheviot mine, particularly the impacts of the Project on grizzly bears.

The Panel also notes that Parks Canada is now an active participant in the regional planning initiatives. This should allow the federal government to ensure that its interests, particularly in Jasper National Park, are addressed. As noted earlier, however, the Panel believes that it is incumbent on the federal government that it be prepared to make whatever contributions to the process are required to ensure that federal interests are protected. **The Panel recommends adequate resources for effective participation by Parks Canada in regional access planning initiatives be identified.**

As noted earlier in this report, the Panel also continues to believe that habitat protection, particularly for wildlife, should be increased in the upper Cardinal River watershed. In *Decision 97-8*, the Panel suggested that the most effective means to accomplish this might be to amend the existing protective notation to further restrict motorized access or to include the upper Cardinal River watershed into the Cardinal Divide Natural Area. The Panel recognized at that time that such restrictions would have some adverse effect on access by motorized recreation users, but concluded that the numerous direct and indirect benefits outweighed the cost.

In light of the evidence presented at the recent hearing, it is clear that motorized access to the upper Cardinal River watershed likely continues to erode its value for wildlife. It also appears to

greatly reduce its value as a buffer between areas of significant human use and the protected natural areas in Jasper National Park and the Cardinal Divide. The Panel continues to be of the view that the further protection of this area offers a significant opportunity to mitigate the effects of the Cheviot Project on regional wildlife populations, particularly the grizzly bear. Once again, the Panel strongly suggests that AENV seriously consider prohibiting OHV access to the Cardinal River alpine zone as soon as possible, preferably through its inclusion into some form of permanent protected area designation. However, this action should also occur in conjunction with a plan to ensure that these activities are transferred to a more suitable location and not just into another sensitive environment.

With regard to the regional cumulative effects of increased access, the Panel notes that, despite the best efforts of all participants to the hearing, there does remain a relatively high degree of uncertainty associated with the future extent of new access development in the region. The Panel also understands that there are inherent difficulties in quantifying the extent of linear disturbances, estimating the intensity of their use, and deciding how these estimates might be projected into an uncertain future. There is also uncertainty about the threshold densities at which linear disturbances threaten the ecological integrity of a region.

In spite of the difficulties in quantifying the impacts of regional access patterns, the Panel believes some conclusions can be reached. First, it would appear that road densities in most of the BMSUs are either below or just approaching the acceptable road density thresholds for grizzly bears that have been set for other regions of the continent. Second, these thresholds will likely be exceeded in the future in a number of BMSUs under plausible assumptions about industrial road development unless the development and retirement of access are managed through such means as shared roads and road closures. The Panel infers from this that the long-term preservation of grizzly bears in this region will likely only be compatible with other land uses if steps are taken to coordinate access management on a regional basis.

The Panel agrees with AENV that tools such as multiple-use corridors, joint-use roads, timing constraints, and gating are available to limit the adverse impacts of access. Within the context of clearly stated regional objectives for access management and an established process to achieve them, the Panel concludes that the above tools can effectively mitigate any regional future cumulative effects from human access. The Panel also concludes that the various planning initiatives in the region should all be able to play an important role in the implementation of these options. **Therefore, the Panel recommends that the federal government accept these initiatives as acceptable mitigation for future potential impacts associated with regional access.**

The Panel understands that the Strategic Framework process is intended to establish targets and thresholds for landscape conditions in support of grizzly bear conservation and that the process is expected to take about three years. This time period with respect to the Cheviot mine and its impacts on regional access is acceptable. However, the Panel encourages AENV to also consider setting interim thresholds for linear disturbances within the broader region until specific targets are established. The Panel notes that there is a growing body of literature that could be used to provide some guidance in this task. While it is understood that there is a risk in uncritically

borrowing benchmarks from other jurisdictions, the Panel also notes that there is also an inherent risk that the planning processes may take longer than expected to complete. It would be unfortunate if the events that all parties are working so hard to prevent, such as significant damage to regional bear populations, should occur during the planning process.

The Panel also notes that some of the tools required to manage the cumulative impacts of linear disturbances appear to be available already. In particular, Weldwood's road management plan and road management catalogue (part of its annual stewardship report) appear to provide at least some of the monitoring data needed to manage road densities for the portion of the cumulative effects study area constituting Weldwood's FMA. It would seem reasonable that similar data could be collected for other forms of linear development (primarily oil- and gas-associated seismic, road, and pipeline development) and incorporated into a single database. The Panel will ask EUB staff to work with AENV to ensure that the activities of the energy industries are coordinated with other developments on a regional basis to the extent possible. Once regional thresholds have been established, the Panel will also instruct EUB staff to ensure that both the coal and the oil and gas industries coordinate their development activities in such a manner that road density levels are maintained below the agreed-upon standards.

9 ABORIGINAL ISSUES

In undertaking its CEA, CRC examined traditional use as one of the eleven VECs. However, during the hearing, questions were also raised about the adequacy of consultation with aboriginal peoples. Both issues are discussed below.

9.1 Traditional Use of Land and Resources

9.1.1 Views of the Applicant

CRC stated that it had conducted a regional traditional-use study as part of its 1996 application to the Panel. CRC supplemented this assessment in its 1999 CEA, which considered traditional use as a VEC. Additional information on policy and treaty considerations and the results of continued discussions with affected aboriginal groups regarding their traditional-use histories and interests in the region were also provided.

CRC indicated that it had focused its assessment of Project impacts on traditional use on those lands within about 25 km of the mine site. However, it had also considered traditional use of lands at a regional scale, since the AFN, a signatory to Treaty 6, claimed traditional use over most of the area. CRC's interpretation of traditional use of the region by the various aboriginal interests is provided in Figure 8. The temporal boundaries for the CEA on traditional use consisted of current conditions (fall 1999) and the predicted conditions at the end of the Project life (2025). Traditional uses in the Project region covered a range of activities, including hunting, trapping, fishing, gathering (particularly medicines), spiritual values, ceremonial sites, historic homesteads, burial sites, and various trails.

In assessing the potential cumulative impacts on traditional use and access, CRC focused on two general types of effects: direct impacts on traditional sites and restriction of access to traditional-use areas. CRC noted that it did not directly assess cumulative effects on other traditional-use activities, such as hunting and fishing, that might be affected through Project effects on biophysical components (e.g., wildlife populations and fisheries). These were considered, instead, as part of its assessment of cumulative effects on each VEC.

With respect to direct impacts on specific traditional sites, CRC reported that its investigations of graves and ceremonial sites had determined that there were such sites located in an area north of the Red Cap Range. Mining in the Red Cap area, scheduled to occur several years into the Project development, would affect these traditional uses. The loss of specific sites due to the Cheviot mine would be permanent, with the magnitude of the effect being specific to the site involved. Given some of the spiritual values noted for this area, CRC predicted that from an aboriginal perspective the effects of the Cheviot Project would be considered major, long term, and potentially not recoverable.

CRC observed that traditional trails passing through the Cheviot mine site and precontact archaeological sites along these trails, particularly in the Harris Creek Valley, had also been recorded and were assessed as part of the requirements under the *Alberta Historical Resources*

Act. CRC reported that it was collaborating with the Mountain Cree Camp Syllabics Institute to further study the existence of these trails, especially in the vicinity of proposed mining operations. Additional trail studies had also been undertaken by the Mountain Cree Camp Syllabics Institute with Suncor Energy and TransCanada Transmission in areas adjacent to the Cheviot study area. CRC predicted that the Project's effects on these historic trails would be limited to the Project area, long term, minor, and possibly not recoverable. CRC did note that a physical trail could be incorporated into the postmining landscape.

With respect to other development in the region, CRC reported that traditional-use consultations between Luscar and the aboriginal communities regarding its mine extension proposals had indicated there were no sites within the existing or proposed development area for Coal Valley and that the Project effects on traditional use were insignificant at Gregg River. CRC also noted that the Inland Cement quarry occupied a relatively limited area and its effect on traditional use, if any, would be localized.

CRC noted that timber harvesting and associated road construction activities had taken place for an extended period of time in the region and were scheduled to continue and expand throughout much of the study. CRC believed that the provincial regulatory requirements for aboriginal consultation prior to approval would ensure that any disturbances of traditional-use sites on a local basis would be effectively mitigated. CRC summarized that effects from forestry development activities on traditional use would be regional, long term, minor, and recoverable.

With regard to current and future oil and gas development, CRC reported that it was aware that consultations between industry and aboriginal groups were taking place regarding impacts on traditional use and the appropriate mitigative measures. CRC noted that seismic, road construction, and well site and pipeline development were carried out under a provincial regulatory system that required application, review, and approval before direct disturbance could occur. These steps also required consultation with aboriginal communities, identification of direct effects on local traditional-use sites, and avoidance or protection where such sites were identified. For these reasons, CRC concluded that any effects of petroleum and natural gas activity on traditional use would be regional, long term, minor, and recoverable.

In terms of cumulative effects on access to traditional-use areas, CRC stated that it had determined that the AFN and Mountain Cree Camp had general traditional-use interests in the Cheviot Project area in terms of access for hunting and gathering of medicinal plants. CRC indicated that as mining progressed over the projected 20-year mine life, the full development area would eventually be covered with a mineral surface lease and that access to this area would be restricted for reasons of safety. Although the impacts of access restrictions would depend on the traditional use sought at a particular time, CRC predicted that these impacts would be limited to the Cheviot mine site. These impacts would be local and short term, since access restrictions applied by CRC would be removed upon completion of the mining development.

CRC stated that it had also examined the extent to which other resource development activities might affect access for traditional use. For forestry, CRC noted that such operations have historically placed few restrictions on access by others, so that general access to traditional-use

areas was expected to be largely unaffected by forestry operations. While vegetative cover would be removed, CRC believed that current planning practices would ensure the maintenance of general forest conditions over time.

In terms of recreation, CRC noted that although the newly established Whitehorse Wildland Park and implementation of the Coal Branch Forest Land Use Zone would have implications for traditional-use access, AENV had committed to honour treaty rights for traditional pursuits in the new park, including hunting, fishing, and traditional gathering of plant material. AENV had also indicated an intention to conduct further consultations directly with aboriginal peoples regarding traditional uses in the park. With implementation of these plans, CRC expected that the effects of regional recreational developments on access to traditional-use areas would be negligible.

In terms of mitigation measures, CRC reaffirmed the commitments made in its 1996 EIA and indicated that these were appropriate to reduce impacts on aboriginal traditional use. The measures included

- undertaking environmental protection programs to minimize the Project's effect on aquatic, terrestrial, and other resources;
- providing familiarity with environmental monitoring programs through involvement of the local aboriginal communities in site monitoring;
- implementing an access management review with local aboriginal communities whereby annual development plans were reviewed and access provisions related to traditional uses such as medicinal plant harvest were established;
- conducting ongoing consultations and investigations related to possible traditional-use sites and the development and implementation of protocols in the event such sites were encountered;
- participation in regional resource management initiatives undertaken by provincial authorities; and
- maintaining a "good neighbour" relationship with the local aboriginal communities and respecting the people and their culture.

Even with mitigation, CRC predicted that there was a high probability that aboriginal land use would be affected by the cumulative effect of all of the above activities—ongoing and planned—in the Project vicinity. However, CRC concluded that the probable magnitude and duration of these effects were difficult to determine. This was due in part to lack of a comprehensive inventory of traditional-use interests, the wide variety and sometimes dispersed nature of traditional uses, and the nature and variable effects of the likely development activities.

Overall, CRC believed that the effects on traditional use and access would be insignificant from the perspective of both the Project and regional cumulative effects. In terms of the Cheviot mine,

CRC offered several reasons for this conclusion. First, while some loss of access to the mine site area would occur, such losses were anticipated under Treaty 6 (where lands taken up for mining and other activity are removed from treaty rights). Second, some of the potential effects would be minimized by CRC's commitments to local and regional mitigation. Third, the mining operation was a temporary use of the lands and these lands could continue to be used for traditional activities when reclaimed. CRC said that it recognized that effects on the traditional use of the Red Cap Creek drainage portion of the mine may be considered significant by the Mountain Cree Camp, but it was encouraged by the statement that the Mountain Cree Camp was becoming more open minded about mitigation.

CRC offered other reasons for concluding that the regional cumulative effects on traditional use would also be insignificant. It noted that general access for traditional pursuits would be relatively unaffected, except in local areas primarily associated with mine sites, because forestry or petroleum and natural gas activities usually placed rather limited restrictions on access. Second, CRC believed that there appeared to be effective consultation between industry and aboriginal peoples in the region for the purposes of identifying and avoiding the development of potential traditional-use sites. Third, CRC expected the direct impacts of forestry, the most extensive future development activity in the region, to be relatively low, particularly on specific traditional sites. This was due to procedures in place to inventory and mitigate significant sites and to adapt forest harvest activities to mimic natural events, such as fire disturbance patterns. Finally, CRC noted that relatively few traditional sites had been identified. It believed that this was in part due to the lack of inventory, but intensive reviews of at least three mine sites had found few sites, suggesting that they may not be common in the region.

9.1.2 Views of the Interveners

The AFN, represented by Chief Alexis, summarized its long-term plans for Reserve lands that border the southeast corner of the Cheviot lease and lie approximately 24 km from the processing plant (Figure 8). The AFN stated that it hoped to establish an aboriginal cultural centre and ecotourism operation that would require "an interesting diverse environment with clean water, abundant wildlife and clean air" in as natural a state as possible. The AFN stated that the location of the Reserve, selected subsequent to the announcement of the Project, was chosen as much for its natural attributes as "for the future socioeconomic benefits this Project may hold for our community." To that end, the AFN and CRC had entered into a socioeconomic agreement regarding job creation, business opportunities, and other Project-related benefits for AFN members. The AFN and CRC were also in the process of negotiating a memorandum of understanding respecting monitoring, assessment, and mitigation both on and off site and on Reserve.

The AFN affirmed both its concerns about the environment and its support for the Project. It observed that to date CRC had demonstrated goodwill and good faith in its consultations and negotiations. Chief Alexis said that, according to their oral history, the intent of the treaties of 1876 was to share the land and to have a working relationship with the dominant society. He said that the AFN's dealings with CRC marked the first time in the history of his people that they had

had the opportunity to have input into that sharing relationship "to work together; a partnership, joint ventures."

The Mountain Cree Camp stated that members of the camp continued to live in the area of the Project and in the zone of cumulative effects of industry. Consequently, camp members wanted to be part of the ongoing process of communication and involvement in resource development activities. The Mountain Cree Camp stated that it continued to be very concerned about the adverse effects from the Project, particularly on its philosophy and on the environment it needs for its survival. The Mountain Cree Camp expressed particular concerns regarding the need to notify residents of the camp about activities that might affect them. They also expressed interest in the opportunities for researchers to share the traditional knowledge of their elders and the need for the involvement of their young people in helping to carry out land- and animal-related research. The Mountain Cree Camp was still of the opinion that the Cheviot mine was not a good idea for that area and that it would prefer a natural preserve. However, the Mountain Cree Camp also indicated that it was willing to work with industry, wanted to have employment, wanted to use technology to mitigate the effect of development on their people, and admired CRC's good-neighbour policy.

The Mountain Cree Camp also expressed concern about the effects of mining, oil and gas, and forestry activities on traditional grizzly bear and human trails and described its work with the Mountain Cree Camp Syllabics Institute to identify these trails. The Mountain Cree Camp Syllabics Institute stated that it was a registered charitable organization concerned with the investigation and interpretation of petroglyph and pictograph sites. It provided the Panel with a description of the need for and potential means of identifying and protecting trails in the area. Through the work of the Mountain Cree Camp Syllabics Institute, the Mountain Cree Camp hoped to discover the pattern of precontact trails region, in part because these ancient trails may guide them to as yet undiscovered petroglyph sites. Moreover, the Mountain Cree Camp Syllabics Institute suggested that identification of trails used routinely by grizzly bears may also provide a means of avoiding conflict with humans to the benefit of both species.

The Mountain Cree Camp Syllabics Institute noted that the regional historic trails were created in a variety of ways. Some were created by various animals, including grizzly bears, as paths or travel corridors to move about the landscape. Indigenous peoples created other trails, including ceremonial trails associated with the rites of passage of the Cree and Saulteaux peoples, and trade trails linking this area to other parts of North America. According to the Mountain Cree Camp Syllabics Institute, the proposed surface disturbances associated with the Cheviot mine were located at a convergence of these routes and threatened to obscure the evidence of precontact trails and their destinations. The Mountain Cree Camp Syllabics Institute therefore wished to document any evidence of prehistoric trail patterns before the cumulative effects of development erased the trails. Trails of archaeological value could then be preserved.

Consultants for the Mountain Cree Camp Syllabics Institute described how synthetic aperture radar, a remote sensing technology useful in detecting surface and near-surface features, had been used to find archaeological resources elsewhere and could be used to detect undiscovered trails in the area. The Mountain Cree Camp Syllabics Institute believed that a remote sensing study of

trails in the area would "...satisfy indigenous, archeological, local, community, historical, and many other interest groups' curiosity and wish to preserve a history, a prehistory, and a grizzly bear travel ethologue, all otherwise subject to the cumulative effects in the area." The Mountain Cree Camp Syllabics Institute asked the Panel to recommend that a remote sensing study be undertaken to document the pattern of trails in the area.

Ms. O'Chiese, an aboriginal woman, said she spoke to the Panel as a representative of Mother Earth. Ms. O'Chiese stated that she had been named after Mother Earth and came forward "to speak for her because she cannot speak for herself." Ms. O'Chiese spoke of her concerns over land loss and degradation caused by mining activities in the general area of the proposed mine ("in the Foothills and the mountains") and by industrial development generally in Canada. She also spoke about aboriginal philosophies and ways of life and strongly emphasized that, in her view, the Project was at odds with these. She also discussed her people's understanding of aboriginal treaties and the *Indian Act*, noting the discrepancies between what the treaties and *Indian Act* were meant to protect/preserve and what, in her view, was actually happening.

The Treaty 8 FN argued that through an oral tradition the First Nations people of Treaty 8 FN had long had the belief that the area around the proposed Cheviot Coal Project had been part of their traditional hunting and gathering grounds. This area was also an important route for trade and commerce with aboriginal people from the west and the south.

9.1.3 Views of the Panel

The Panel notes that none of the interveners to the hearing challenged CRC's views as to the cumulative effects of the Project in association with other forms of area development on traditional use in the region. The Panel believes that, with one exception, CRC's assessment is a reasonable one. The Panel does not accept CRC's finding that preventing access to traditional-use areas within the mine site for 25 years or more is a short-term effect. The Panel believes that this adverse effect is long-term, from the perspective of the Mountain Cree Camp and that the impact is significant. The Panel does conclude that, with the exception of traditional uses within the mine development area and traditional sites located in the Red Cap portion of the mine and with implementation of the mitigation measures designed collaboratively by CRC and each of AFN and the Mountain Cree Camp, the regional adverse effects on both traditional use and traditional sites are not significant.

The Panel accepts and understands the ongoing concerns of the Mountain Cree Camp and the AFN and notes that CRC has continued to work to try to alleviate these. The Panel concludes that the measures developed collaboratively by CRC, the AFN, and the Mountain Cree Camp to reduce the impacts on traditional use of the lands and resources in the Project study area will be effective. The Panel also accepts the company's commitment to continue to work with these communities and attempt to ensure that they have an opportunity to share in the economic benefits of the Project. The Panel therefore concludes that any residual adverse effects on traditional use and traditional sites can be justified within the scope of the Project as a whole.

The Panel recommends that the federal government accept these conclusions and the mitigative strategies for impacts to traditional uses and sites.

The Panel, through its EUB approvals, will require CRC to report to the EUB annually on its success in carrying out the various mitigative measures that it has proposed to identify and protect traditional sites and reduce adverse impacts on traditional use of the lands and resources.

With regard to the need to further map traditional trails in the region, while the Panel found the presentation to be of interest, the Panel was unable to determine whether such studies were warranted. The Panel does note that other companies in the region have participated in such studies and would suggest that CRC avail itself of the results from those investigations. The Panel notes that CRC has committed to ensuring that, to the degree practical, traditional-use sites will be protected from the effects of mining operations and would suggest that the company reconsider the proposal after seeing those results.

9.2 Consultation with Aboriginal Persons

9.2.1 Views of the Applicant

On the issue of consultation, CRC reported that its communication with Treaty 8 FN began in the summer of 1998 after Treaty 8 FN had withdrawn from the federal court action. CRC indicated that at a meeting requested by the Treaty 8 FN environmental secretariat it offered Treaty 8 FN the opportunity to respond to its EIA. Treaty 8 FN agreed to submit a proposal and budget for preparing this response and subsequently did so. CRC stated that discussions broke down in early 1999 after it rejected Treaty 8 FN's proposal because the scope and expense of the proposal was significantly beyond what CRC had anticipated. According to CRC, Treaty 8 FN's prime concern appeared to be related to water and the effects of the Project given its location "at the headwaters of rivers running through Treaty 8 lands." Further, Treaty 8 FN had proposed an extensive study and monitoring committee similar to that in place for the Northern River Basins Study. When asked if Treaty 8 FN had ever mentioned consultation by government as a precondition to talking with the company, CRC replied that it had not. The parties had, however, discussed the list of items to be considered in the consultation process between them.

CRC argued that there was no proper legal basis for the Treaty 8 FN's position that Treaty 8, together with the *Natural Resources Transfer Act, 1930,* meant that aboriginal people must be consulted before government could approve resource development activities anywhere in the province. Based on Treaty 8 FN's decision not to put evidence before the Panel, CRC argued there was no factual basis for Treaty 8 FN to have a position in front of the Panel in relation to the Project. CRC observed that there was no evidence that any members of Treaty 8 FN (bands or individuals) would be affected by the environmental effects of the Project. Nor was there any evidence that any members of Treaty 8 FN (bands or individuals) exercised any rights in the Project area or that any members of Treaty 8 FN (bands or individuals) were making a claim with respect to aboriginal or treaty rights in relation to the Project area or the cumulative effects study area.

CRC further stated that the Panel's duty under its federal mandate was only to make recommendations. The obligation to consult, if any, would be applicable, CRC argued, at the point where a federal decision is to be made, and likely that point would be prior to DFO making its decision to issue its authorization under the *Fisheries Act*. On the provincial side, CRC noted that the EUB decisions are already in place and had not been challenged since their issuance. Consequently, CRC concluded that the time for initiating any legal challenge to those authorizations had expired and the EUB's decision, as represented in its 1997 decision report, could not be appealed.

9.2.2 Views of the Interveners

Treaty 8 FN chose not to present any evidence at the hearing. Rather, Treaty 8 FN claimed through its counsel that while it had environmental concerns associated with the Project, it could not begin to address those issues adequately until it had been consulted by the Crown in relation to its treaty rights. Treaty 8 FN's counsel took the position that because the Crown had not carried out its consultation obligations with the First Nations covered by Treaty 8, there was no information before the Panel on either the actual impacts on those First Nations or the mitigation measures that could be undertaken by the Crown. It was these mitigation measures, Treaty 8 FN argued, that the Panel must assess under Section 16(1) (a) of *CEA Act*. In its view, there was no requirement for Treaty 8 FN to submit evidence to the Panel to make its case, because the issues were entirely legal in nature.

Those legal issues, Treaty 8 FN argued, related to the Crown's fiduciary duty to consult aboriginal people about effects an activity might have on their aboriginal and treaty rights before granting approval for that activity to proceed. Where there was infringement of an aboriginal or treaty right, the Crown must ensure that compensation for that infringement was forthcoming. Treaty 8 FN asserted that Treaty 8 and the *Natural Resources Transfer Act, 1930*, created for its members a constitutionally entrenched right to hunt, trap, and fish anywhere in the Province of Alberta and, further, that the Project constituted a *prima facie* impact on its treaty and aboriginal rights. In particular, Treaty 8 FN identified potential effects from the Project on the Athabasca River system and on the surrounding area affected by forestry and mining.

Treaty 8 FN stated that it had been unable to identify those impacts in any detail because it had not been consulted by the Crown. Treaty 8 FN argued that in law, the onus was on the Crown to consult with potentially affected First Nations to address aboriginal interests. If it were then determined to be affected, the Crown would have an obligation to assess whether that effect was warranted in accord with the approach set out by the Supreme Court of Canada regarding consultation and compensation for infringement of treaty rights. Treaty 8 FN argued that the Crown's failure to do this was unfair to both the aboriginal people and the applicant. Furthermore, it would be an error in law for the Crown to fail to report to the Panel whether any adverse effects on aboriginal and treaty rights were justified.

Treaty 8 FN went on to state that while the Panel owed no fiduciary duty, the Panel was acting in a judicial capacity with regard to the matters before it and therefore its decision would be subject to Section 52 of the *Constitution Act, 1982*. Treaty 8 FN believed that the Panel could not,

therefore, approve the Project unless it was confident that consultation with the affected First Nations had been completed by those representatives of the Crown who had a fiduciary obligation to those First Nations. Treaty 8 FN argued that the Panel would not be fulfilling its duty under the *Canadian Constitution Act, 1982,* or under *CEA Act* if it made a decision in relation to the Project before that consultation had properly taken place. Treaty 8 FN recommended that the Panel's final approval of the Project be subject to the condition that the Crown conclude its consultation obligations to Treaty 8 FN and that recommendations for mitigation of the impacts arising from that consultation process be presented to the Panel.

The AFN also argued that the Crown had a duty to fully assess the impacts of the Project on the exercise of its treaty rights. The Crown also had a duty to direct mitigation and where necessary order compensation prior to issuing any approvals that potentially interfered with or infringed upon the exercise of their constitutionally enshrined treaty rights. The AFN stated that it had not been approached by either the federal or provincial government with regard to the potential impacts of the Project on either its lands or treaty rights. Further, the AFN claimed that neither level of government had consulted it on its views regarding the impacts of the Project or provided financial support to address these issues.

The AFN stated that the fiduciary relationship between the Crown and First Nations requires the Crown to place the interests and rights of First Nations before those of other parties. Based on the likelihood that the Project activities may adversely affect the exercise of the treaty right to hunt, the aboriginal right to acquire plants for medicinal and spiritual purposes, and the quantity and quality of water flowing through its Reserve, the AFN expected full consultation from the Crown. The AFN felt that the result of those consultations would ensure that all reasonable precautions would be taken by CRC and the governments themselves to prevent unreasonable infringement and to protect water flowing through the Reserve.

With respect to CRC's consultation efforts, the AFN noted that it had been working cooperatively with CRC to review and assess the environmental and socioeconomic effects of the Project on the AFN. Further, the AFN indicated that it had cooperated in an extensive traditional aboriginal land-use study of the area in 1994-1995 and that CRC had agreed to additional consultation on future permit applications. Although the AFN was satisfied this consultation process would occur, it reserved the right to intervene in future application processes if unsatisfied with either CRC's consultation process or its mitigation or remediation measures.

At the hearing, Mr. Percy Potts, speaking as a member of the AFN, stated that CRC had sat down with the AFN and carried out a consultation process that was meaningful. CRC had recognized that the members of the AFN had a right to the fish and wildlife resources, to be employed, and to have security for their children and their health. He further said that CRC had given the AFN the opportunity to participate with industry and he hoped that the AFN would be able to establish similar relationships with the oil and gas industry. He asserted that the Project was located in Treaty 6 territory and thanked CRC for respecting the treaty. He also asserted that the Panel should not interfere with discussions between First Nations regarding the matter of traditional territories.

Mr. Nadeau, on behalf of the Mountain Cree Camp, stated that elders of the Mountain Cree Camp, on their own initiative, made the deliberate decision to leave the society of government-dominated programs to return to living on the land. He said that it was a type of healing and it was very important for them to have a place to continue their way of life. Not only did they want to be notified about activities that might affect their livelihood, safety, and way of life, but they also wanted to be involved in the studies related to development projects. He said it was disheartening to see the results of studies that did not even mention their group, because they actually live in the area where the projects and studies were taking place. He felt the Mountain Cree Camp had traditional knowledge to contribute that would be of value to those studies. Moreover, participation by their young people would be good for their education and make them useful members of both societies.

The All Colors Society submitted but did not speak to a letter that alleged that the Panel process was not properly representing the treaty rights or constitutional rights of aboriginal peoples. In the letter, the All Colors Society reminded the Panel of its responsibility to inform all ministers at both levels of government of those rights.

The Provincial Crown, as represented by the Minister of Environment and the Minister of Health and Wellness, was of the opinion that the issue of adequate consultation was outside the jurisdiction of the Panel. First, it took the position that this issue went beyond any deficiencies identified by Justice Campbell. It argued that the Panel's only obligation in the context of aboriginal peoples was to evaluate and make decisions and recommendations in respect of how the Project in combination with other industrial and recreational disturbances might affect traditional land use.

Second, the Provincial Crown was of the opinion that there was no basis upon which the Panel could make a determination of Treaty 8 FN's alleged constitutional right to be consulted by either the federal or provincial governments. It argued that the matter of consultation was not properly before the Panel, so there was no need or obligation to make a determination prior to making a decision and/or recommendations relative to the Project. Furthermore, it argued that it was beyond the Panel's jurisdiction as both a quasi-judicial body under the *ERC Act* or as a body under the *CEA Act* to adjudicate on constitutional rights matters.

The Provincial Crown noted that the issue of whether there was a constitutionally entrenched right of the Treaty 8 FN to be consulted in circumstances where Alberta had exercised its authority, under the *Natural Resources Transfer Agreement* (confirmed as a Schedule to the *Constitution Act, 1930*), to take up land for purposes such as mining was currently before the courts. The Provincial Crown also referenced decisions of the Alberta Environmental Appeal Board and the EUB that acknowledged their respective lack of jurisdiction to make determinations of aboriginal rights.

9.2.3 Views of the Panel

On the issue of consultation, the Panel notes that CRC has developed a positive working relationship with the aboriginal peoples who currently routinely use the Project mine site and the

Project area for traditional purposes or whose lands might potentially be directly affected in the future by the Project, i.e., the Mountain Cree Camp and the AFN respectively. Sustained consultation by CRC both prior to the original hearing and subsequently has resulted in several apparent benefits. These include the creation of a mechanism by which the AFN will participate in monitoring environmental effects of importance to the AFN and the conclusion of an agreement regarding socioeconomic benefits for members of the AFN. CRC has also initiated further trail studies with the Mountain Cree Camp in an attempt to mitigate the effects they feel might impact them negatively. **Therefore, the Panel concludes that CRC has carried out reasonable and adequate consultation with these two aboriginal groups and recommends that the federal government accept this conclusion.**

With respect to the issue of Project-related notification and consultation with Treaty 8 FN, the Panel notes that CRC has met with Treaty 8 FN on a number of occasions. The Panel finds, given the circumstances, that the consultation initiatives undertaken by CRC have been adequate. Despite disagreement over the scope of and financial support for Treaty 8 FN participation, CRC has expressed a willingness to keep the channels of communication open to explain its Project and its predicted environmental effects. In this case, the Panel concludes that CRC has met the current standards for public consultation by an applicant. The Panel also notes that Treaty 8 FN received funding through the *CEA Act* participant funding program and appeared and argued a number of issues before the Panel in the current hearing phase. These, the Panel believes, represent additional opportunities for consultation with regard to the proposed Project. **The Panel recommends that these conclusions also be accepted by the federal government.**

With regard to the legal aspects of the Crown's obligation to consult, the Panel is of the opinion that it has no jurisdiction to make a determination in relation to either the aboriginal or the constitutional rights of Treaty 8 members. The Panel also notes that this issue is currently before the courts for resolution.

With respect to environmental effects on Treaty 8 FN, the Panel notes that in his decision, Justice Campbell found that the Panel had not adequately fulfilled its obligation under the *CEA Act* to obtain all available information about likely mining and forestry activities in the vicinity of the Project and then to consider that information with respect to cumulative environmental effects when reaching conclusions and making its recommendations. The Panel believes that it has now met those obligations. Justice Campbell did not find the Panel in breach of its duty to obtain all available information about Project-related effects (direct or cumulative) on use of lands and resources by aboriginal people for traditional purposes, even though this issue was raised by Treaty 8 FN in those proceedings.

Nevertheless, the Panel is mindful of Justice Campbell's remarks requiring the Panel to obtain all available relevant information regarding the factors listed in Section 16 of the *CEA Act*. In the context of Treaty 8 FN and the *CEA Act*, the factors the Panel must address in its consideration are set out in the terms of reference established for the review. These state that the Panel must address the effects of Project-related environmental changes, including the effect of

any such change on health and socio-economic conditions, on physical and cultural heritage, on the current use of lands and resources for traditional purposes by aboriginal persons, or on any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.

The Panel finds that CRC has provided sufficient information in its 1996 EIA, its 1999 CEA, and the evidence presented during the hearing to enable the Panel to address these issues, reach conclusions, and make appropriate recommendations to the federal government. Based on that information, the Panel concludes that it could find no evidence that would reasonably suggest that the proposed Cheviot Project will cause any change to the health and socioeconomic conditions of any First Nations of Treaty 8. Nor did the Panel find that there was any significant risk to their physical or cultural heritage or to their current use of lands and resources for traditional purposes.

With respect to the specific environmental concerns raised by Treaty 8 FN related to effects on water quality (levels of selenium and of nitrogen from blasting), water quantity, fish and the fishery, and wildlife), the Panel notes that the lands covered by Treaty 8 and the locations of the Treaty 8 FN communities are at some considerable distance from the Project study area and outside the area where Project-related effects (direct or cumulative) are anticipated to occur. CRC's assessment of the Project-related and cumulative effects predicted for each component of the environment raised by Treaty 8 FN also did not indicate any negative effect on the Treaty 8 FN. At no point did Treaty 8 FN present evidence to the Panel that would suggest that there was a reason to suspect that there could or would be any Project-related effect on Treaty 8 FN members or on their access to and use of lands and resources. The Panel therefore concludes that there is an insignificant risk of any negative adverse effect as a result of the cumulative effects of the Cheviot Project on these various environmental components that will result in a change to the health and socioeconomic conditions of the members of Treaty 8 FN. The Panel reaches the same conclusion regarding their physical heritage, cultural heritage, and their current use of lands and resources for traditional purposes.

On the issue of consultation by the Crown, the Panel notes that all aboriginal groups that appeared before the Panel reported that there had been no consultation or communication by either level of government with them regarding treaty or aboriginal rights that might be affected by the Project. The Panel believes that the persistence of this issue—an issue of tremendous significance not only to aboriginal peoples but to industry as well—does not foster a positive environment within which industry and First Nations can develop a good-neighbour policy and pave the way for constructive, enduring relationships. **The Panel recommends both levels of government assess and clarify, in a timely fashion, their perceived respective obligations in relation to consultation with First Nations in the region.**

10 OTHER ISSUES

10.1 Project Benefits, Costs, and Viability

In November 1999, the AWA Coalition applied for intervener funding to undertake studies to address what it perceived to be gaps in the information provided to the Panel by CRC. These were

1) an assessment of alternatives to the Project,
2) a social benefit-cost analysis, and
3) an analysis of the Cheviot Project within future coal markets.

Although none of the Panel's previous findings on this matter was questioned in Justice Campbell's ruling, the Panel believed that it was appropriate to determine whether there had been a substantive change from the information on this subject submitted at the previous hearing.

Therefore the Panel stated that it was prepared to provide funding directly to the AWA Coalition in order to ensure that the costs and benefits of the Project from a provincial perspective were addressed thoroughly. The Panel also directed CRC to provide additional information on the long-term viability of the Project and to be prepared to speak to this issue at the hearing.

At the hearing, CRC objected to the AWA Coalition presenting evidence or opinion on the viability of the Cheviot mine or the analysis of social benefit-cost of the Project. CRC argued that such information was clearly beyond the four issues identified by Justice Campbell and related specifically to the question of Project need, which CRC believed was fully dealt with in the Panel's original 1997 decision report. Furthermore, CRC noted that the adequacy of the analysis of Project need had been raised as part of the federal court litigation and that Justice Campbell had specifically concluded that the Panel had met its duty under Section 16 (1)(e) of the *CEA Act* with respect to considering the private and public need for the Project.[1]

In reply, the AWA Coalition argued that in the prehearing meeting *Memorandum of Decision* the Panel had indicated that it was prepared, if needed, to look beyond the four issues identified by Justice Campbell and had in fact provided it with funding for the social benefit-cost analysis. The AWA Coalition also argued that both CRC and NRCan had provided new information on coal markets and project viability, and therefore the AWA Coalition should be allowed to address that evidence. Furthermore, the AWA Coalition argued that evidence related to Project need and viability must be balanced against evidence relating to environmental effects and was therefore germane and relevant to the hearing.

Having considered these arguments, the Panel reconfirmed that it was prepared to consider new relevant evidence related to Project need and viability.

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[1] See Federal Court-Trial Division, No. T-1790-98, decision rendered April 8, 1999, footnote 46.

10.1.1 Social Benefits and Costs

10.1.1.1 Views of the Applicant

CRC noted that it had submitted an assessment of the economic impacts of the Project as part of its initial application. That assessment showed that operation of the Cheviot mine would result in 640 person-years of employment and $31.2 million in household income per year in the Hinton/Edson region. Were the Project not to proceed, the existing workforce at the Luscar mine, which was scheduled to close shortly, would be forced to seek employment elsewhere. Therefore, the estimates of Project economic benefits could also be viewed as the economic cost of not proceeding with the mine. At the 2000 hearing, CRC reiterated its conclusion that Project benefits would exceed costs and disagreed with the findings of the research conducted by the AWA Coalition that showed the Project's benefits and costs would be of approximately the same magnitude. CRC stated that it also continued to strongly believe that the regional economic benefits of the Project clearly outweigh the environmental impacts.

CRC argued that, for various reasons, the alternative estimates of Project benefits calculated by the AWA Coalition were incorrect. It argued that in using a Social Accounting Matrix (SAM) model, the AWA Coalition used the wrong measure for the value of coal production (i.e., $90 million instead of $126 million) and consequently calculated much lower estimates of Project economic impacts. Had the correct value of production been used, CRC stated, the results of the SAM model would have been similar to its estimates of regional impacts.

CRC also questioned the AWA Coalition's second method for estimating Project benefits. Although it agreed that Computable General Equilibrium (CGE) models better reflected how economies really worked, CRC argued that reducing its original estimates by a factor of five to seven times, based on the results of selected studies done elsewhere, would not accurately reflect conditions in the Hinton/Edson region. It noted that if the Project were not approved, the resulting loss of 400 mine jobs and associated income ($28 million) would be much higher than the $7 to $11 million suggested by the AWA Coalition's analysis, unless the majority of displaced mine workers were to find other, equivalent jobs in the region. CRC believed that this was highly unlikely, particularly given that the CEA had concluded that there were no new mines planned for the region in the near future. CRC believed that a CGE analysis could be used to better estimate Project benefits, but only if the model were developed specifically for the Hinton/Edson region and for the mining sector.

CRC also questioned the procedure used by the AWA Coalition to quantify the benefits of leaving the landscape in its existing state. While it agreed that nonmarket values existed, could be measured, and could be factored into a social benefit-cost analysis, CRC disagreed with the procedure that the AWA Coalition used to assign values to the protection of habitat for grizzly bears and other endangered species in the region. CRC noted that the AWA Coalition employed a valuation process called "benefits transfer," whereby value estimates from a study conducted in one area were applied to a similar situation in another area. In this case, CRC noted that the AWA Coalition based its analysis on the results of an academic research paper that compared

two different approaches to measuring nonmarket values using the woodland caribou habitat enhancement program in Alberta as a case study and associated data from a survey of a sample of Edmonton residents.

CRC questioned the AWA Coalition's use and interpretation of the research paper on four counts. First, it disagreed that values for grizzly bear habitat could be inferred from a study of woodland caribou, especially since caribou were not found in the area surrounding the Cheviot Project. Second, CRC suggested that assuming a value of $75 per year as a conservative estimate of the value that households would place on increasing caribou populations was an incorrect interpretation of the study results. Third, the company questioned whether data collected from Edmonton residents were relevant for other Alberta households. And finally, CRC noted that the AWA Coalition had been unable to show that the Cheviot mine would actually impede achievement of the provincial grizzly bear management plan, which CRC argued was a central assumption of the AWA Coalition's analysis. For these reasons, CRC concluded that the context, methods, and assumptions used in the caribou study were sufficiently different from the Cheviot situation that the resulting value estimates should not be used in the social benefit-cost analysis.

CRC also believed that the analysis presented by the AWA Coalition could not actually be considered a formal social benefit-cost analysis and that there were several reasons for reaching this conclusion. First, CRC noted that the AWA Coalition had factored the economic impacts of the mine into the analysis, rather than the actual benefits. Since impacts address distributional considerations rather than a Project's net economic gain (or loss), a comparison of Project impacts with economic costs would not, in CRC's view, yield any meaningful information about the net benefit of the Project. Second, there was no projection of future benefits or costs with or without the Project. Third, the majority of the analysis did not use discount rates to factor future benefits and costs into present value equivalents.

10.1.1.2 Views of the Interveners

The AWA Coalition presented the results of its social benefit-cost analysis and drew two key conclusions. The first conclusion was that CRC had substantially overstated the economic benefits of the proposed Cheviot mine. The second was that preserving the area could result in benefits at least equivalent to the expected economic benefit of proceeding with the mine. Based on these findings, the AWA Coalition concluded that the Cheviot Project would be a risky use of public resources and would not be in the public interest.

In its analysis, the AWA Coalition claimed that the methodology used by CRC to derive Project impacts on Alberta gross domestic product (GDP) significantly overstated Project benefits. It argued that CRC's use of input/output (I/O) analysis was inappropriate because this reflected an outdated, static view of a provincial economy. I/O analysis, in the AWA Coalition's view, could not adequately describe how producers and consumers would behave in a dynamic regional economy, where prices and technology were always changing and there may be limits to labour, capital, and natural resources. As an alternative, the AWA Coalition advocated the use of a CGE model, which it claimed would better capture demand and supply relationships, consider substitution effects, and employ more realistic assumptions about resource constraints. The

AWA provided several examples of studies that showed that the results of I/O models were often five to seven times greater than the estimates generated by CGE models. Consequently, the AWA Coalition completed its analysis by assuming that the CRC estimates should be deflated by a factor of five to seven. Instead of an annual increase in provincial GDP of $97.3 million, as estimated by CRC, the AWA Coalition asserted that a more accurate assessment would be in the range of $12 to $20 million.

To further support its assertion that Project benefits were overstated, the AWA Coalition also compared the results of CRC's I/O analysis with a SAM model. The SAM model, it noted, was employed in a 1998 study to measure economic impacts in the Foothills Model Forest region, which includes the site of the proposed mine. The AWA Coalition observed that SAM models were similar to I/O models in terms of general methods and assumptions but were built using information specific to a region and were therefore considered more reliable than a regional interpretation of provincial I/O models. The AWA Coalition suggested that since this particular SAM model was used to assess the impacts of closing a $90 million-per-year coal mine in the Foothills Model Forest region, the results could be directly compared to the predicted economic impacts of CRC's Cheviot mine, which would produce coal worth $85 million per year. When compared, the SAM model predicted only 64 per cent of the regional GDP effects estimated by CRC, thereby confirming that CRC's estimates of benefits were overstated.

With regard to its analysis of the social benefit-cost of not proceeding with the mine, the AWA Coalition noted that it had not had sufficient time and resources to collect primary data on the potential benefits of maintaining the region in a relatively undeveloped state. Therefore, it relied on information from other studies to assess both use and nonuse values. Use values, the AWA Coalition noted, referred to benefits arising from direct use of the potentially affected area for recreation. For this aspect of social value, the AWA Coalition stated that it was able to directly use research undertaken by the Canadian Forest Service in the Foothills Model Forest region. This research assessed the economic losses associated with the closure of random camping in the area affected by the proposed mine. Over the life of the Project, this loss-of-use value was expected to be $190 000, assuming a 4 per cent discount rate. The AWA noted that it believed that this amount understated use values because it did not consider activities other than camping, such as day use, nor did it account for any future growth in recreational activity in the region.

The AWA Coalition also noted that Albertans benefited from knowing that wilderness and wildlife species existed, whether they choose to visit a particular area or not. It said such benefits were termed nonuse values. To measure nonuse values for Cheviot, the AWA Coalition noted that it had had to rely on values from studies conducted elsewhere and for wildlife species other than grizzly bears. However, the AWA Coalition argued that the results of a 1995 study of Edmonton residents pertaining to protection of woodland caribou were directly applicable to the Cheviot area. It noted that both species are endangered, have a high public profile, and have similar management plans.

The AWA Coalition stated that this study found that Edmonton households would be willing to pay between $75 to $200 per household, or a total of $21.75 million per year, to achieve sustainable levels of caribou. Furthermore, they were prepared to do so even if this meant higher

taxes, decreased recreation, and reduced employment in the regional forestry sector. The AWA Coalition argued that the results from the Edmonton-based survey could also be extrapolated to a provincial level because the collective opinions of Calgary residents, at least, would likely be similar. Thus, the Coalition estimated the total nonuse value of protecting woodland caribou within Alberta to be about $75 million per year.

In extrapolating this information to arrive at nonuse values for the Cheviot area, the AWA Coalition stated that it had made two further assumptions. First, it argued that since grizzly bears were only one of the endangered species in the Cheviot region, the total Alberta nonuse benefits associated with the region could exceed $95 million per year for two species or $135 million for four species. This extrapolation was based on other results from the Edmonton survey, which found that willingness to pay to protect endangered species, as expressed in terms of the successful implementation of species management plans, increased in proportion to the number of species being considered.

Second, the AWA Coalition proposed that because the Cheviot Project was not the only threat to successful protection and management of endangered species in the region, only a portion of the total annual nonuse benefits would be compromised by development of the mine. Because of uncertainty about the extent of the impacts of the mine on endangered species, the AWA Coalition assumed that the mine would be only 20 per cent responsible for not successfully achieving the desired effects of wildlife management plans. With this assumption, the AWA Coalition argued that loss of nonuser values as a result of the Cheviot mine would range from $15 million per year in the case of grizzly bears, up to $27 million if three other endangered species were included. If the impact of Cheviot amounted to only a 5 per cent loss in the ability to successfully implement wildlife management plans, then the annual loss of nonuse values associated with Cheviot was estimated to be in the range of $4 to $7 million. The AWA Coalition believed that these numbers clearly demonstrated the value of preserving the area that would otherwise be developed as part of the Cheviot Project.

The AWA Coalition then compared the adjusted benefits of the Project, which it estimated to be in the range of $12 to $20 million per year, with the loss of use and nonuse values, estimated to range from $15 to $27 million. In making the comparison, the AWA noted that its evaluation may have understated use and nonuse values, since it was based on only a few examples of the types of use and nonuse benefits that Albertans enjoy from the Cheviot area in its current state. It also noted that if the destruction of wildlife habitat proved more severe than predicted or if proposed mitigation measures were not fully effective, the costs of proceeding with the Cheviot mine could also be higher than shown. Consequently, the AWA Coalition concluded that its analysis of social benefit-cost provided a significant reason why the Panel should recommend that the mine not proceed at the proposed location and that the area be given some sort of protected status.

The United Mine Workers of America (UMWA) disagreed strongly with the results presented by the AWA Coalition. The UMWA noted that neither of the analyses presented by CRC or the AWA Coalition fully considered the benefits of the mine in terms of its social and economic effects on the community. It claimed, without using quantitative information, that the benefits of

the mine, as measured in terms of employment in a rural economy, clearly outweighed the need to protect large areas of land. It also argued that the AWA Coalition's analysis did not consider the relocation or dislocation costs that would result if the mine were not allowed to proceed. Without the mine, the UMWA contended, people would have to leave their homes behind and uproot their families or, worse, leave their families in Hinton and commute to new jobs somewhere else.

The Hinton and District Chamber of Commerce also concluded that the AWA Coalition's analysis was incomplete because, in its view, it did not adequately consider the Project's impacts on the citizens or businesses of the community. It also criticized the AWA Coalition for basing part of its analysis on a survey of Edmonton residents when it would be the residents of the Yellowhead region who would experience the impacts of the mine's closure. It also questioned the appropriateness of the AWA Coalition's analysis because it measured the benefits of protecting caribou, which do not occur in the affected area, yet ignored the potential benefits of increased mountain sheep populations that have resulted from the reclamation activities at other nearby mines in the region.

The Mountain Park Environmental Protection and Heritage Association stated that it had assumed that a social benefit-cost analysis would have been completed for the initial hearings and would have included an assessment of the economic values of the Mountain Park landscape, as it now exists. The Mountain Park Environmental Protection and Heritage Association believed that the analysis prepared by the AWA Coalition represented only an initial attempt at quantifying these values, particularly the costs that would result if the Project were to proceed. It strongly disagreed with CRC's apparent assumption that the present value of the existing landscape was zero and that the mine's impact on the scenic landscape would be insignificant. The Mountain Park Environmental Protection and Heritage Association believed that proceeding with the mine might result in a loss of benefits to Albertans that would exceed the economic benefits from mining. However, since the AWA Coalition had to rely on secondary information sources, the Mountain Park Environmental Protection and Heritage Association believed that the real value of the status quo would remain unknown and should be the subject of additional studies. Until such time as these studies were done, the Mountain Park Environmental Protection and Heritage Association noted that there would remain a group of citizens who did not believe that their concerns were or could be addressed by the Panel.

10.1.1.3 Views of the Panel

The Panel agrees that a social benefit-cost analysis can be a useful tool in supporting decision-making. It can be used as a framework for comparing the various benefits and costs of a project and for measuring the economic efficiency of a particular type of resource allocation. However, economic efficiency is but one measure of the public interest, and the Panel must consider many other measures in ascertaining whether a particular project is in the public interest. It must also review and consider quantifiable scientific assessments of impact, as well as the perceptions and values of all interveners.

The Panel commends the efforts of the AWA Coalition in attempting to produce a social benefit-cost analysis in a short period of time and without the benefit of primary research. The Panel also agrees that landscapes and other resources do have intrinsic value, which is often significant. However, it also recognizes that the methods for quantifying these values continue to be contentious, especially if the process requires borrowing value information from studies conducted in other areas. This was clearly evident in the extensive discussions around the reliability of the estimates of both project benefits and costs of the parties to the hearing. The Panel also notes that the social benefit-cost analysis provided by the AWA Coalition did vary from current accepted practices to a considerable degree. As a result, the Panel must take some caution in accepting its findings at face value.

Having weighed the evidence, the Panel concludes that the AWA Coalition's analysis does not adequately support its contention that the economic effects of retaining the wildland areas in the region of the proposed Cheviot mine is of approximately the same order of magnitude as proceeding with the mine. The Panel does agree that CRC's approach likely overstates the economic value of the Project to the region. The Panel also agrees that the value assigned to recreational use of the mine area is likely too low. The Panel believes, however, that the analysis used by the AWA Coalition has had the opposite effect, likely underestimating the economic benefits of the Project and overestimating the benefits of not proceeding with the mine. For example, the Panel believes that the assumption of the AWA Coalition that most of the miners displaced by the closing of the Luscar mine will be able to find other employment in the region is unrealistic. Furthermore, it is even less likely that they would be able to find employment providing even close to their current incomes.

The Panel was also not convinced that the data collected regarding public perceptions and willingness to pay regarding caribou protection and forestry are sufficiently applicable to the facts currently under consideration. The Panel notes that the AWA Coalition's analysis assumes that proceeding with the Cheviot Project will prevent the province from meeting its goals with regard to protecting grizzly bear populations at least and possibly for other species as well. Even if it is accepted that a direct extrapolation of the data for caribou and forestry can be made, this assumption is at odds with the Panel's earlier findings. First, the Panel concluded that it will be possible to mitigate, on a regional basis, the impacts to bear populations. Second, should these mitigation programs not be in place within three years after receipt by CRC of the necessary licences and permits, the Panel is prepared to revisit its approval at that time, on the assumption that any impacts to bears in particular would still be reversible.

The Panel believes that it has available sufficient economic data to support its conclusions and reconfirms its earlier conclusion that the Cheviot Coal Project as proposed will result in a net economic benefit to the region. **The Panel recommends that this conclusion be accepted by the federal government for the purposes of assessing the cumulative effects of the proposed Project.**

10.1.2 Project Viability

10.1.2.1 Views of the Applicant

CRC stated that there had been no substantive changes in the economic viability of the Cheviot Project since 1997. Although world coal prices had declined since 1997, it noted that coal markets, like those of other resource industries, tended to be cyclical in nature, and it expected prices to recover by the time CRC negotiates contracts with its customers. CRC also noted that it had had a 30-year relationship with the Japanese steel mills and had developed a very good reputation for coal quality and security of supply.

To demonstrate the viability of the Project, CRC offered two letters of intent from Japanese mills to purchase coal—one for the first five years of operation of the Project and the second beyond the initial five-year period. These letters of intent would eventually be converted into annual contracts that would specify coal volumes and prices. CRC stated that it also had contracts to supply coal to Korean and Chilean steelmakers. In total, CRC stated that it had commitments to purchase 2.6 to 3.1 million tonnes of coal per year from the Cheviot mine.

CRC acknowledged that Australian mines did have geological and geographic advantages in the coking coal markets. However, CRC claimed that Alberta coal mines had had better labour relations and a better history of reliability. CRC expected that the Cheviot operations would have labour productivity that is 40 per cent greater than current operations at the Luscar mine, and this improvement would ensure its long-term competitiveness in world markets. According to CRC, development of the Cheviot Coal Project did represent a financial risk to the company but, based on its analysis of world markets, it was a risk that CRC was prepared to take.

10.1.2.2 Views of the Interveners

NRCan agreed with the independent expert forecasts used by CRC's consultant to assess world coal markets and also with CRC's analysis and conclusions.

The AWA Coalition provided extensive evidence related to world coal markets and the potential for coal from the Cheviot mine to compete in these markets. The AWA Coalition claimed that Japanese steel producers, the world's largest purchasers of coking coal, were shifting their technology in order to be able to use semi-soft coal, rather than the harder coking coals that would be produced at Cheviot. Therefore, with the demand for hard coal dropping, coal prices were predicted to remain low. As a result, the AWA Coalition stated that although coal prices were cyclical, the general trends suggested that prices were not expected to recover to previous levels. In addition, it claimed that the Japanese steel industry was now basing its purchasing decisions on coal prices, rather than security of supply, and demanding more flexibility in coal contracts. Thus, it claimed, there was also more uncertainty in the marketplace.

In terms of world supply, the AWA Coalition testified that Australian mines were expected to expand their production of both hard and semi-soft coking coals, both of which were higher in coke strength than coal from Cheviot. It also noted that the Australian mines had very low

operating costs, due to significant increases in labour productivity and recent reductions in royalty rates, and suggested that these mines would have a significant cost advantage (about 20 per cent, or $7 per tonne) over Canadian coal mines. It argued that the Australian mines' lower costs of production had already led to the closure of the Quintette mine in British Columbia because of its much higher production costs and despite its contractual arrangements with the Japanese to supply three million tones of coal per year. The AWA Coalition argued that in order to remain competitive for Japanese coal markets, western Canadian coal mines would have to find means of further reducing their costs of production.

The AWA Coalition also provided an analysis of the costs of production for various coal mines in Canada. Its analysis showed that average costs would range from US$28.90 to US$41.14 per tonne, with the costs for Cheviot being US$34.68. The AWA Coalition suggested that the main reason for the variability among mines was mining costs and the amount of materials that had to be moved to access coal deposits (stripping ratios), rather than transportation costs. The AWA Coalition argued that the relatively higher stripping ratio for Cheviot would put it at a competitive disadvantage with respect to some other western Canadian mines. It also argued that a potential expansion of Luscar's Line Creek mine in British Columbia could produce the same quantity of coal as the Cheviot mine but at a lower cost.

Based on its analysis, the AWA Coalition concluded that the cost of producing Cheviot coal would be slightly higher than the average costs of Canadian competitors and significantly higher than the average costs of Australian competitors. Based on its expectations of a shrinking world market and lower prices for hard coking coal, the AWA believed that the Cheviot mine development was a significantly risky business proposition and that shareholders would not get a full return on their capital investment. Because of this risk, the AWA Coalition concluded that the Cheviot Project was not in the public interest.

The UMWA challenged the AWA Coalition's evidence on the mine's operating costs. It noted that the Luscar mine had recently decreased its operating costs by $5 million without reopening its labour contract, reducting jobs, or suffering operating losses. It suggested that such changes in operating costs would allow Alberta mines to remain competitive in world markets.

10.1.2.3 Views of the Panel

The Panel has reviewed the evidence on project viability and world coal markets provided by CRC and various interveners to determine whether there has been a substantive change since the previous hearing. At this hearing, the AWA Coalition presented many of the same arguments about declines in the demand for coking coal from Japanese steel producers that it presented at the 1997 hearing. At the most recent hearing, however, these arguments were supplemented with considerable new information on the costs of mining at Cheviot and at other mines in western Canada and Australia.

The assessment of the viability of a project in the face of changing market conditions is always a difficult proposition, especially where a project may operate for 20 years or more. In this case, the Panel was faced with conflicting assessments about future conditions where all parties have

appeared to use many of the same independent expert forecasts, but with different interpretations. The Panel does agree that coal markets have been highly variable and that current market conditions have continued to be significantly less than optimal for coal producers.

Notwithstanding the above, the Panel continues to believe, as it did in 1997, that the available evidence indicates that the Cheviot Coal Project remains economically viable into the foreseeable future. **The Panel recommends that the federal government accept this conclusion for the purposes of assessing the cumulative effects of the Project.**

The Panel notes in reaching this conclusion that CRC clearly has a well-established market niche and a proven record of successfully marketing its products on a world scale. The Panel also notes that CRC is still seeking regulatory approval for its Project, despite the three-year delay since receiving the original approvals and additional information about future world coal markets. CRC's continued commitment to invest the substantive amount of capital needed to develop the Cheviot mine and its 20 years of successful operation of the Luscar mine, the Panel believes, strongly support CRC's contention that the Cheviot Project is economically viable.
The Panel also notes that the Project will be developed sequentially over several years. Therefore, impacts to the regional landscape will to some degree be incremental, particularly in the more environmentally sensitive western portions of the mine. If the Project does become uneconomic in the future, impacts beyond the extent of development to that date will be limited.

10.2 Mountain Park

10.2.1 Views of the Applicant

At the reconvened hearing CRC took no further position with respect to the former community of Mountain Park.

10.2.2 Views of the Interveners

At the hearing, the former residents of Mountain Park took the opportunity to again raise its concerns with regard to the disturbance of the former town site by the proposed coal development. In its submission, the Mountain Park Environmental Protection and Heritage Association noted other intervener submissions that indicated the Mountain Park landscape does have value in monetary terms. It suggested that this landscape value should be incorporated into a benefit-cost analysis for the Project. The Mountain Park Environmental Protection and Heritage Association also drew the Panel's attention to a membership survey that strongly suggested the need to avoid filling in creek valleys and to ensure that pits are backfilled.

10.2.3 Views of the Panel

The Panel notes that the issues raised by the Mountain Park Environmental Protection and Heritage Association were addressed in some detail in the original decision. Nor was any new evidence presented for the Panel's consideration during the new hearing. In addition, Justice Campbell did not identify this as an area where the Panel had potentially made a reviewable

error. While the Panel can understand the strong ties of the former residents to Mountain Park, the Panel is not persuaded that there is a compelling reason for it to vary or rescind its original decisions regarding this matter.

10.3 Harrison/Long Coal Lease No. 138204007

In its original decision, as a condition of the EUB approval of the Project, the Panel excluded all of Section 35-45-24-W5M and the southwest quarter of Section 36-45-24-W5M from the mine permit area. This decision was taken as a result of the Panel's concern with the potentially extensive environmental impacts associated with mining in this alpine and subalpine region. In making this decision, the Panel was cognizant of the fact that this exclusion would have an effect on a coal lease held by the Harrison/Long family.

10.3.1 Views of the Applicant

CRC took no further position during the reconvened hearing with respect to the exclusion of Section 35-45-24-W5M and the southwest quarter of Section 36-45-24-W5M from the mine permit area and the impact of this on the Harrison/Long coal lease.

10.3.2 Views of the Interveners

While there was no representative of the Harrison/Long family at the reconvened hearing, Mr. William Long, on behalf of the family, provided a submission that expressed disappointment with respect to the Panel's decision to exclude a portion of its coal lease from the mine permit area. In the submission, Mr. Long advised that contact had been made with the Alberta Department of Resource Development with a view to initiating discussions regarding compensation.

10.3.3 Views of the Panel

The Panel has reviewed its earlier decision with respect to the exclusion of Section 35-45-24-W5M and the southwest quarter of Section 36-45-24-W5M from the mine permit area. The Panel is still of the opinion that exclusion of this area from active mining is in the public interest. The Panel is therefore not prepared to vary its decision with respect to the exclusion of these lands from the mine permit area.

10.4 Sustainability and Economic Diversity

10.4.1 Views of the Applicant

At the initial hearing, CRC presented evidence to show that the operation of the Cheviot mine would have considerable economic benefits for the residents of Hinton and the surrounding region. These benefits would be in the form of direct and indirect employment, household income, and municipal tax payments. CRC argued that if the mine were not approved, there would be few alternative employment opportunities for existing mine workers who would lose

their jobs when the Luscar mine inevitably closed. In its view, the long-term health of the regional economy was closely tied to approval of the new mine.

CRC presented similar evidence at the second hearing. It noted that the regional economy was still heavily dependent on coal mining and that, even with approval of Cheviot, direct employment in the mining sector would likely decrease over time, as mines reached the limits of their coal reserves. CRC reported that the Luscar mine was scheduled to close in 2003, the Gregg River mine was to close in 2008 and, aside from the Cheviot Project, there were no plans to replace these mines. Thus, it still believed that the long-term sustainability of the regional economy was dependent on approval of the Cheviot mine and that the delays resulting from the appeal of the Panel's original decision and the second hearing had resulted in considerable economic and social uncertainty for the mine workers and their community.

10.4.2 Views of the Interveners

Various interveners questioned whether a decision to approve the Cheviot mine would represent the best means of securing the economic future of the region. The AWA Coalition suggested that the wildland and environmental attributes of the region represented its greatest options for achieving an economically sustainable future. It argued that the Coal Branch Sub-Regional Integrated Resource Plan outlined the need for economic diversification and described the role that the wildland landscape could play in achieving this goal. In its opinion, the Project area in its current state was a significant public asset that should not be developed for what it believed was a risky and relatively short-term coal development. The AWA Coalition submitted that the best use of the area was being designated as a park.

CNF raised the concept of having Hinton become a sustainable "gateway" community. CNF argued that because Hinton is a gateway to Jasper National Park and the relatively undisturbed wilderness of the foothills, the town could learn much from similar communities in the United States. It summarized the results of a recent study that examined U.S. gateway communities to determine how they had balanced the need for a healthy economy with safeguarding natural and historic areas. According to CNF, this study showed that communities that preserved their character and natural values had economies that consistently outperformed those of communities that had not. In conclusion, CNF suggested that the Panel recommend that the federal and provincial governments provide the resources necessary to empower regional residents to help define a future that would be environmentally, economically, and socially sustainable.

WCWC supported the idea of economic diversification for the region. It noted that alternative energy technologies were being developed such that the world demand for coal may be further reduced, resulting in the collapse of communities heavily reliant on coal for their economic base. It noted that without economic diversity, human communities, like ecosystems, were unstable. WCWC suggested that the opportunity for tourism in general and nature-tourism in particular in the Mountain Park area should be explored as an alternative option to continued dependence on coal mining.

Other interveners expressed support for regional economic diversification but disagreed that protecting the Cheviot Project area as a park would result in a net benefit for the community relative to the development of a new mine to replace the Luscar mine. The UMWA questioned how quickly an equivalent number of jobs in tourism and recreation would evolve and noted that such jobs were typically much lower paying than jobs in the resource sectors. It indicated that studies of similar communities on the east slopes of the Canadian Rocky Mountains had indicated that although economic diversification was an important goal, maintaining the economic wealth associated with resource industries was more important. Furthermore, the UMWA argued that the Hinton region already benefited from considerable tourism and recreational development and that coal mining was actually part of the economic diversity of the region.

The Hinton Chamber of Commerce stated that it also supported economic diversification but noted that coal mine sites, when reclaimed, could still offer considerable opportunities for tourist activities, including wildlife viewing, hiking, and horseback riding. It stated that, based on examples from Grande Cache and Tumbler Ridge, conversion from a primary resource-based economy to an economy based on tourism and service industries was not simple. Furthermore, it believed that because gateway communities in the United States were different from those in Alberta, transplanting their solutions for increased economic development might not be successful.

The Mayor of Hinton provided other examples of how the town economy was diversifying through ecotourism development and manufacturing and concluded that taking away opportunities for coal mining would in fact reduce its economic base and cause economic hardships for residents. He suggested that ecotourism and industrial development could coexist and that approval of the Cheviot mine would assist Hinton's attempts to maintain a diverse economy.

10.4.3 Views of the Panel

The Panel believes that there is strong support for regional economic diversification from all parties. The disagreement lies in how this increased diversity will be achieved. The Panel strongly agrees with the view that increased economic diversification can help resource-based communities accommodate the cyclical nature of resource markets and the inevitable closures of mines and other nonrenewable resources. The Panel believes that the concerns about economic diversification and community sustainability will be ongoing and will certainly arise in Hinton again as the proposed closure dates for other mines draw near. However, while the Panel supports the concept of diversification, it can only address this concern within the context of its decision on the Cheviot mine application with respect to Project need. This issue has already been addressed in the Panel's original report (Appendix1).

The Panel does note that the federal government, through Parks Canada, clearly has a mandate to protect the ecological integrity of Jasper National Park. Environment Canada and CNF described a number of international conventions regarding Canada's commitments to sustainable

development. The Panel also notes that the federal government on a number of occasions indicated its concern that meeting these obligations was at some risk.

The Panel believes that the creation of a sustainable, balanced, and diverse economic base in communities such as Hinton that are proximal to federal lands and particularly national parks would be of significant benefit to the Government of Canada in meeting its national and international obligations. **Therefore, the Panel recommends that the federal government determine, in a timely fashion, how it can best contribute to ensuring that this occurs. The Panel recommends that, at a minimum, the federal government be prepared to provide the resources necessary for Hinton and other similar communities to begin to develop long-range sustainable development plans for their regions.**

10.5 Monitoring Programs

During both the initial hearings and the current public review, CRC committed to carry out a number of monitoring programs to ensure that its predictions of adverse effects and the effectiveness of its mitigation and compensation strategies can be determined. These commitments are described in this report and/or contained in the company's submissions. The Panel, through its authority under the EUB, has accepted these undertakings and considers these to be conditions of its approval, whether set out explicitly or not in its two reports and associated approvals. Should CRC fail to carry out these programs, this could result in enforcement actions by the EUB up to and including the shutting-in of mining operations.

In addition, the Panel, again through its EUB authority, has set out in both its original report and in this report additional monitoring programs that it will require CRC to carry out. Again, failure by CRC to carry out these programs will result in the appropriate enforcement actions by the EUB.

As noted earlier, the provincial approval process requires coal mines to apply for sequential approvals for the development of each new pit, waste rock dump, etc. This permits the EUB, AENV, and the public to routinely monitor the ongoing impacts of a project and the success of the various mitigative strategies. The company is also allowed to apply to amend its various monitoring and mitigation programs (i.e., adaptive management) in order to address new or unforeseen circumstances, but changes that vary substantively from the original approvals are brought back by EUB staff to the Panel for its consideration. Based on this, the Panel concludes that the provincial approval process will ensure that the Cheviot Coal Project is carried out in an effective manner.

Some of the interveners to this hearing noted the federal government's relatively limited regulatory role regarding the Cheviot Project. This caused some concerns regarding whether federal objectives would also continue to be met once the Project had received approval. **The Panel notes this concern and recommends that Parks Canada, Environment Canada, and DFO ensure that they receive and assess on an annual basis the results of the various monitoring programs carried out by CRC. The Panel also recommends that these agencies prepare a summary report of their views as to the effectiveness of these programs in**

addressing federal concerns and meet with the EUB and AENV on a regular basis to discuss any concerns that may arise from that review.

Figures

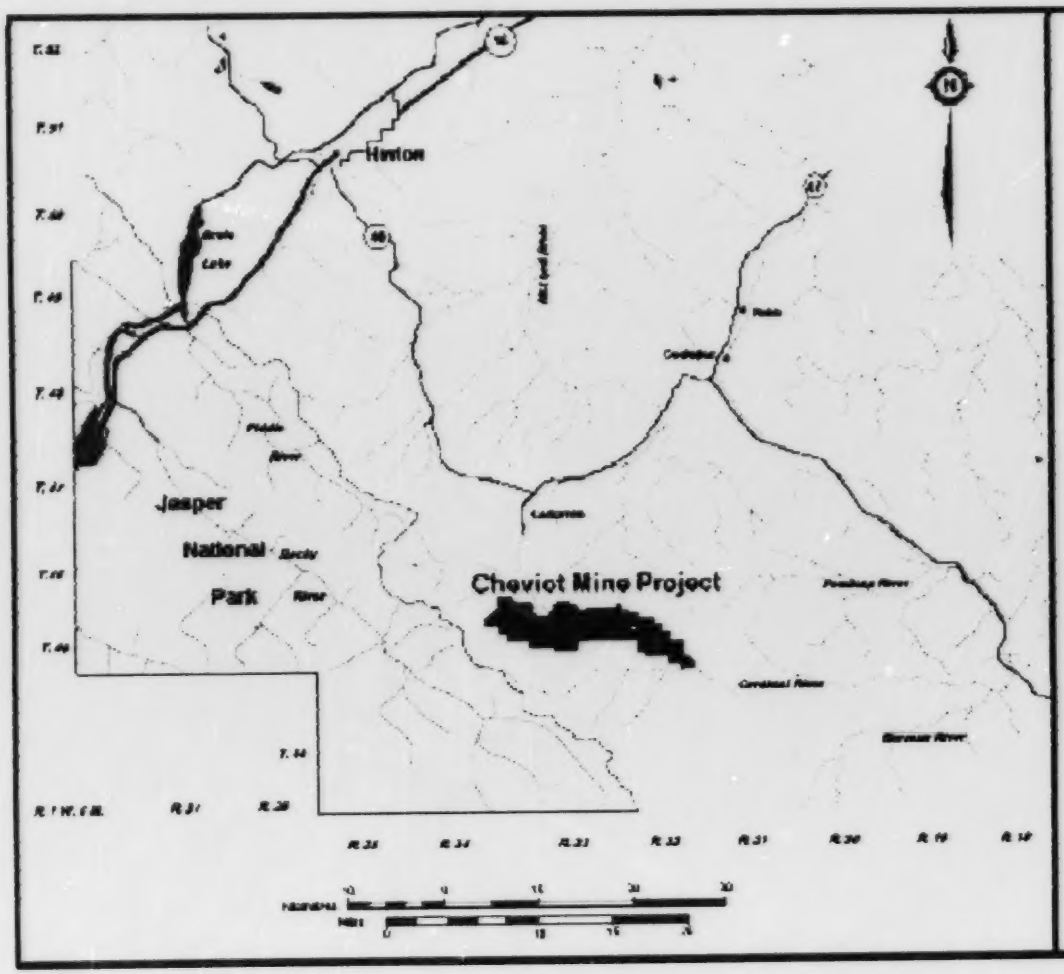
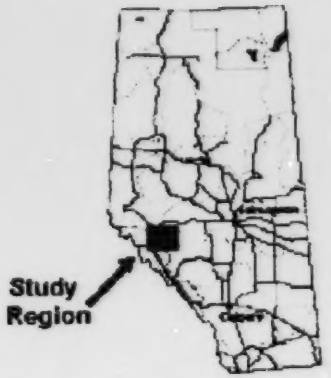


FIGURE 1

LOCATION PLAN OF THE CHEVIOT MINE PROJECT



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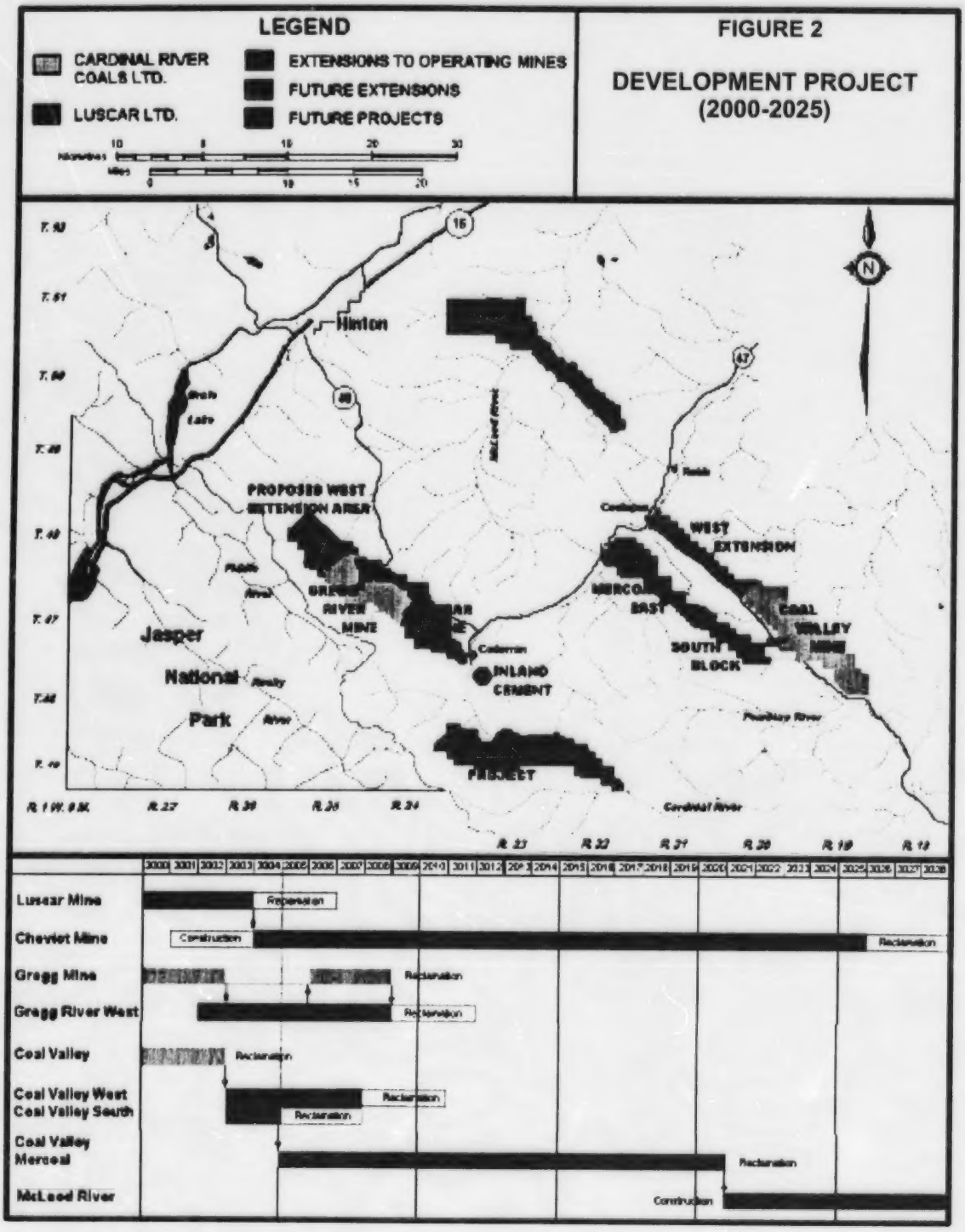

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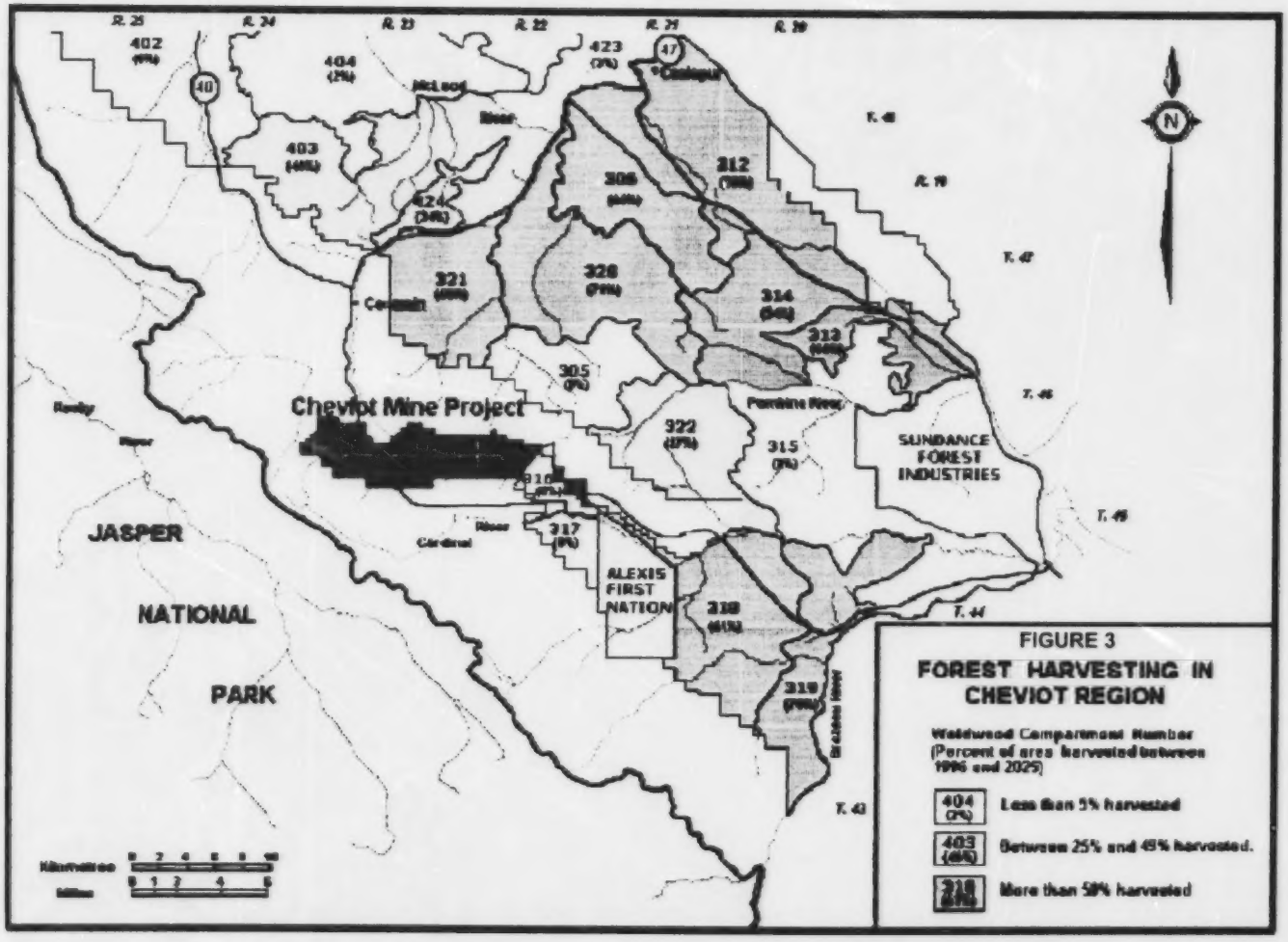

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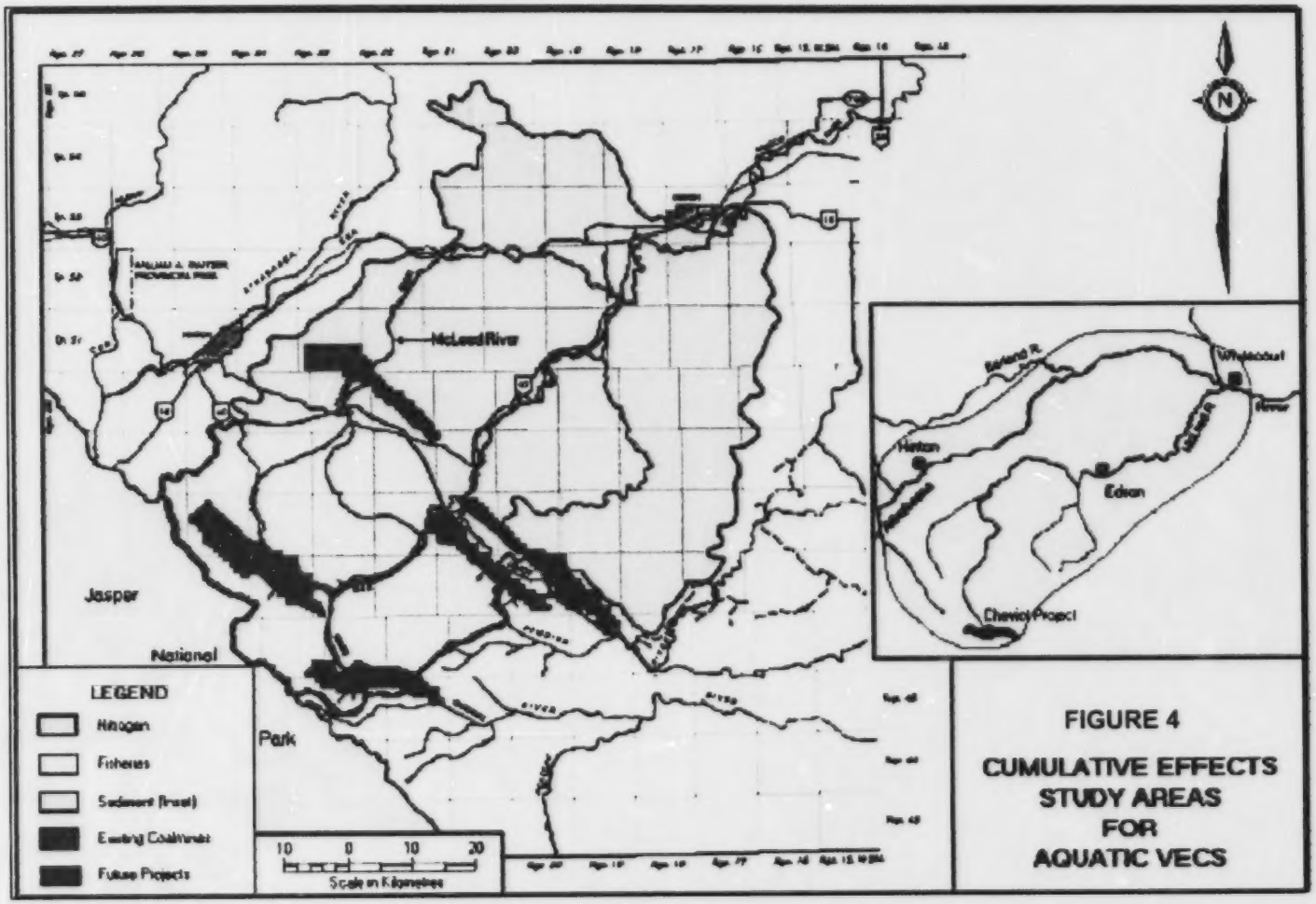

FIGURE 4

CUMULATIVE EFFECTS STUDY AREAS FOR AQUATIC VECS

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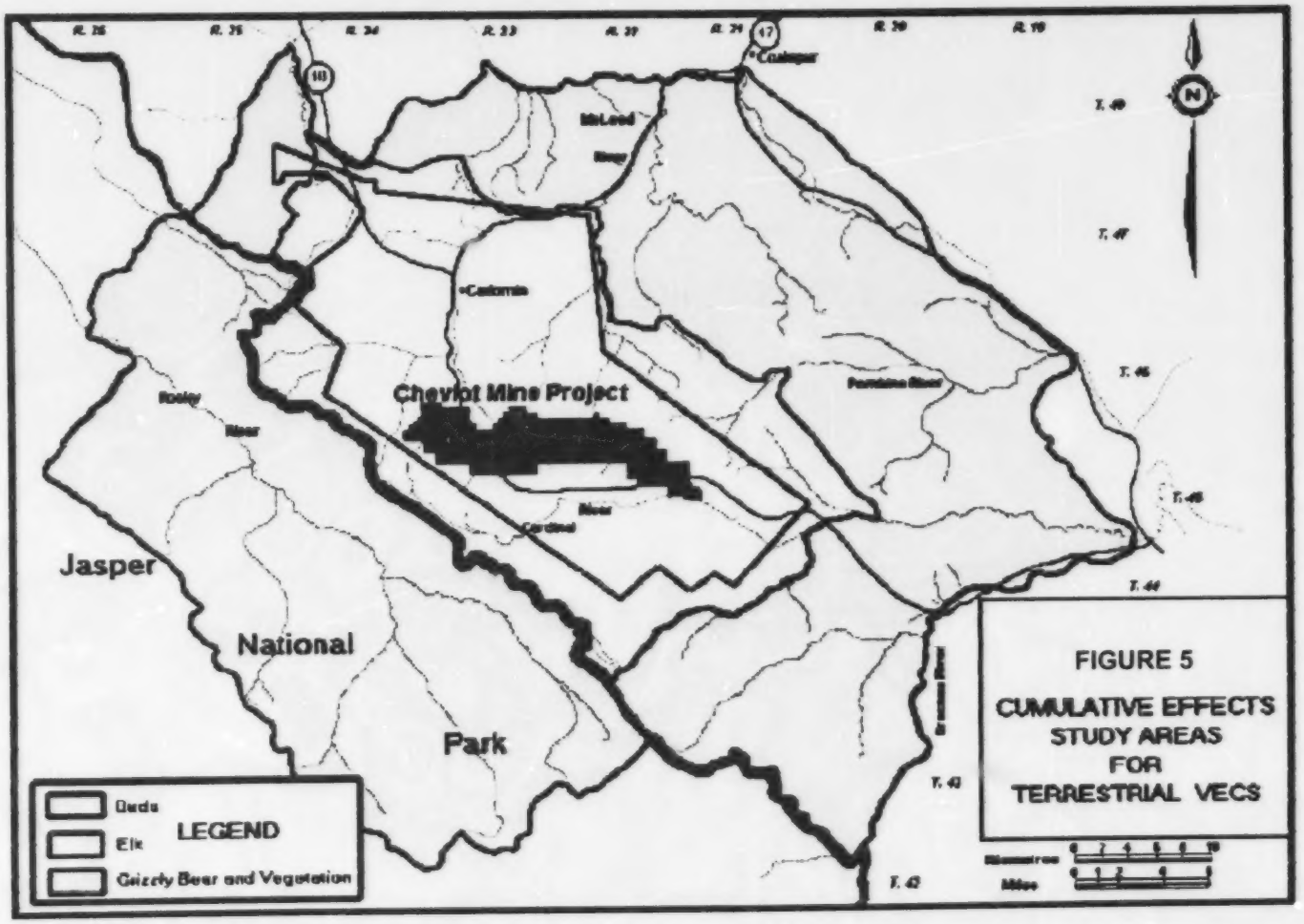

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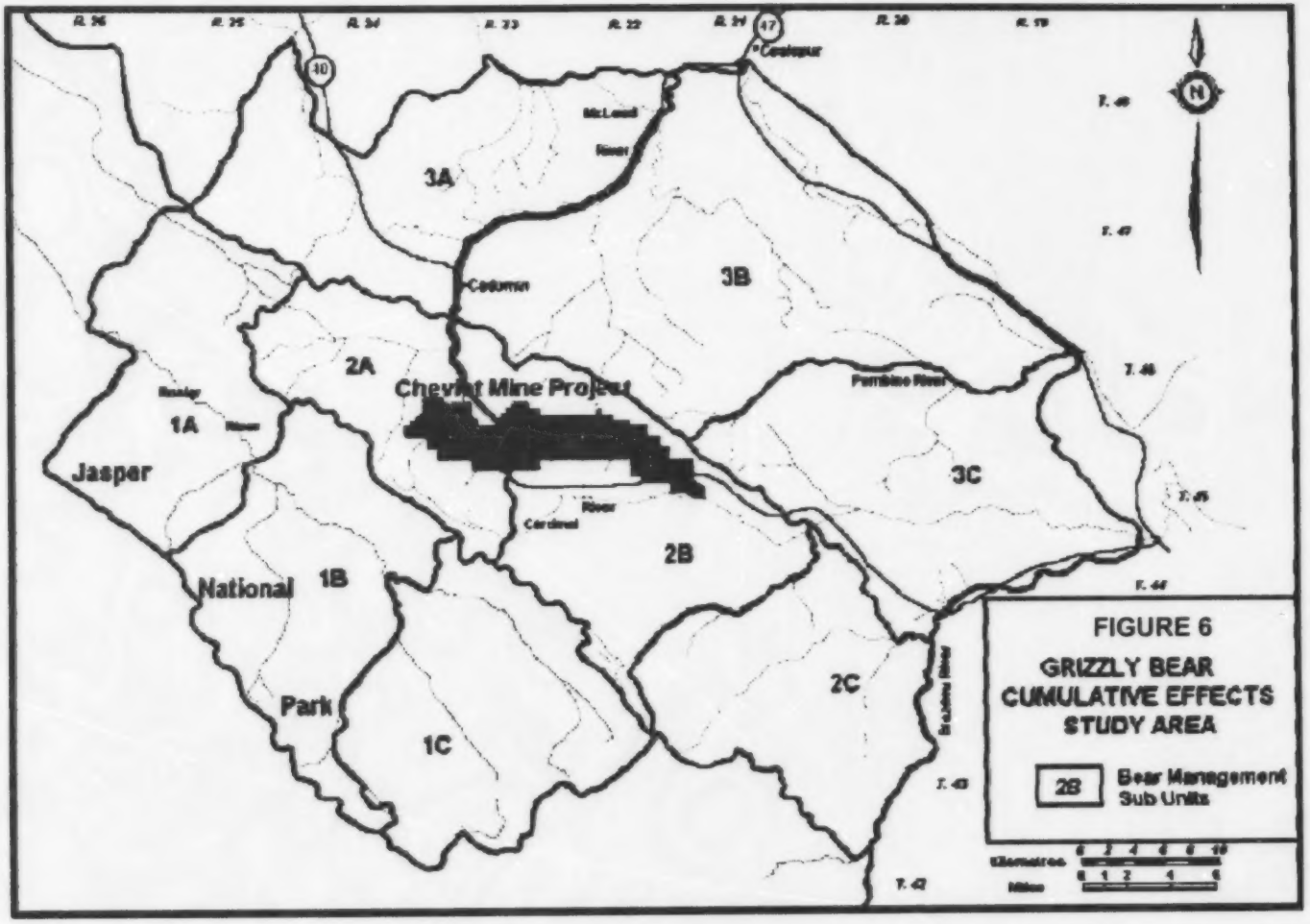
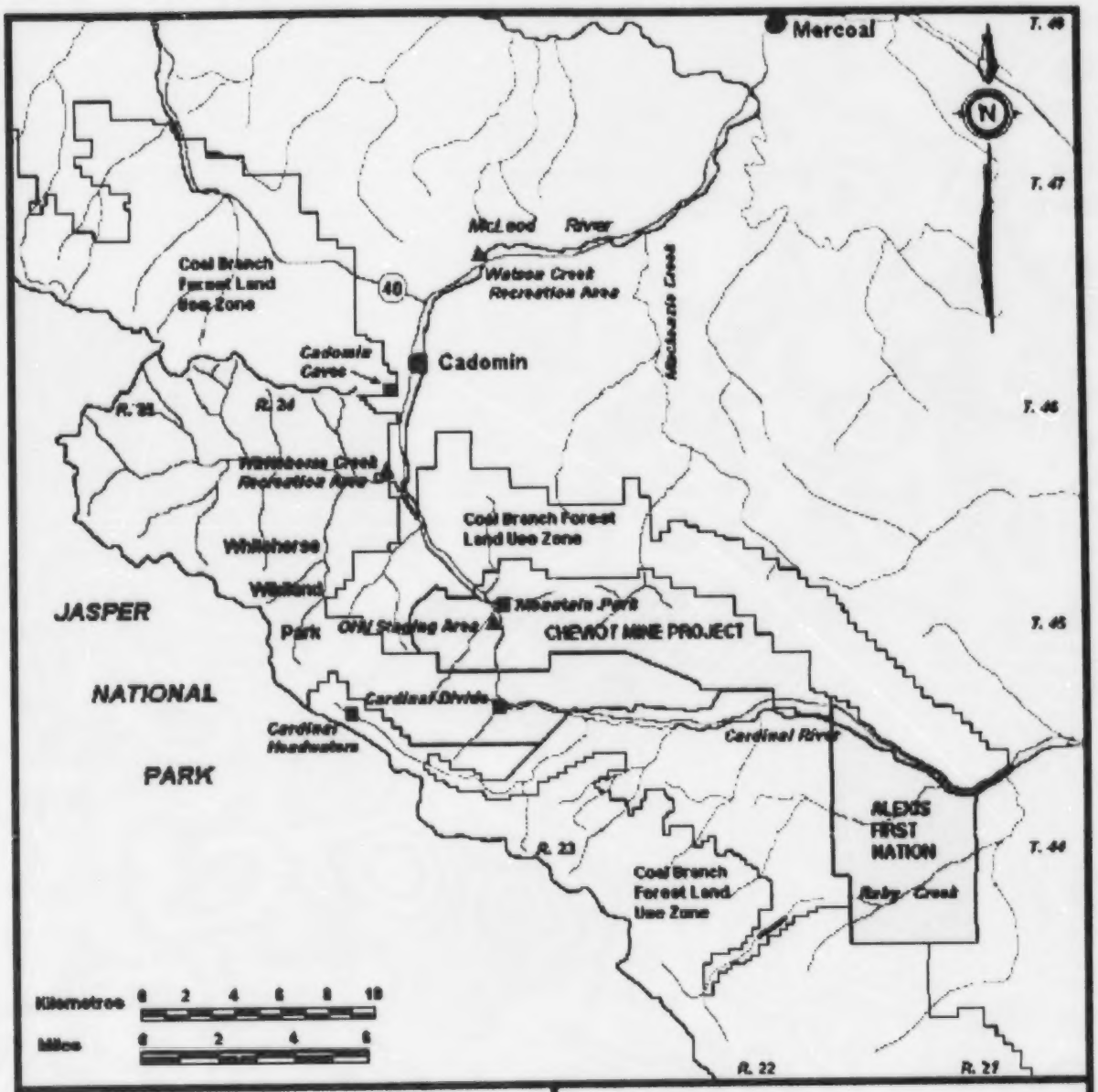


Canada | EUB Alberta Energy and Utilities Board



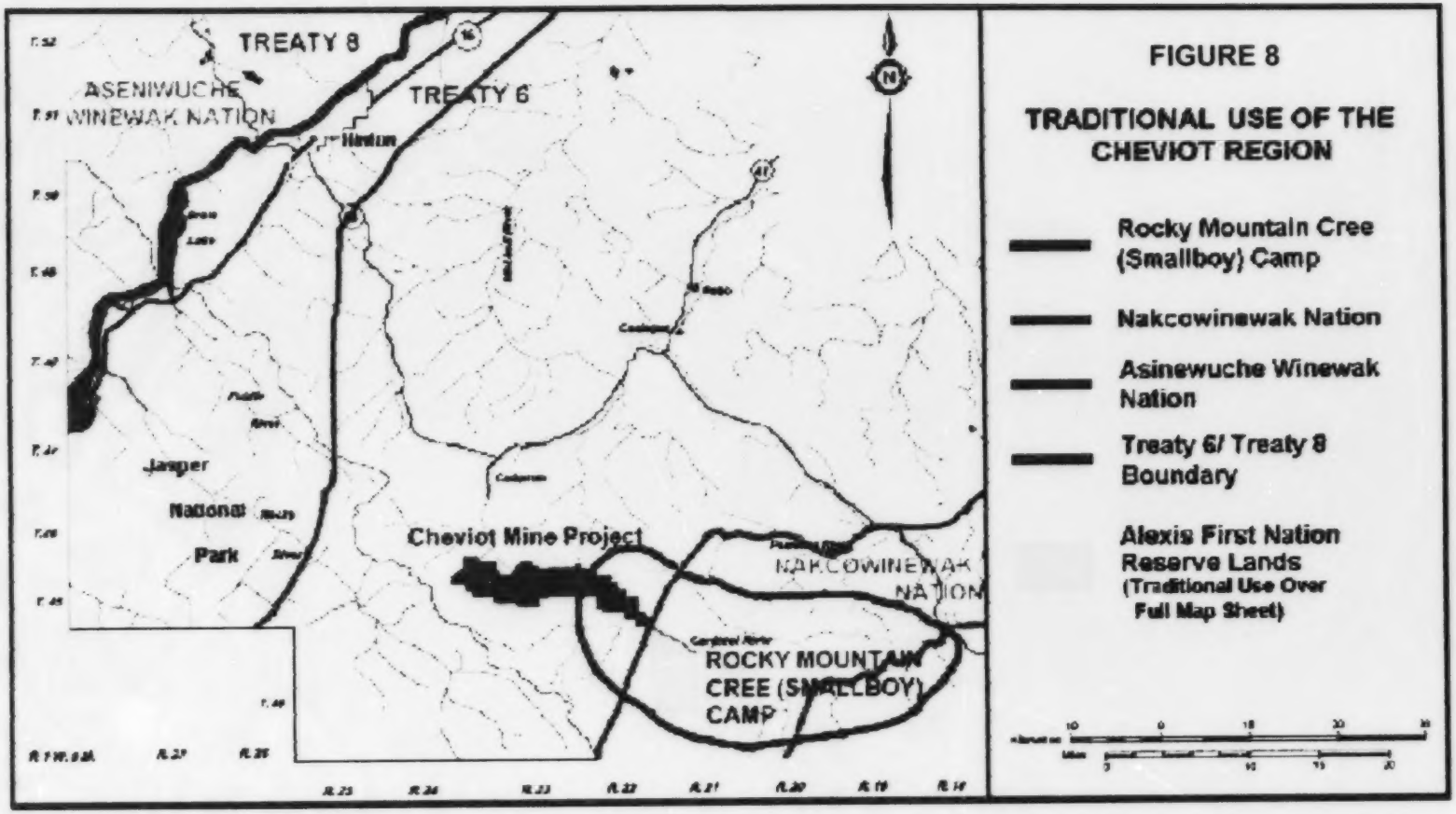
LEGEND

Whitehorse Wildland Park

Coal Branch Forest Land Use Zone

FIGURE 7

FOREST LAND USE ZONES AND SIGNIFICANT RECREATIONAL FEATURES



Canada | EUB Alberta Energy and Utilities Board

Appendix 1

Decision 97-8

Report of the EUB-CEAA Joint Review Panel

Cheviot Coal Project
Mountain Park Area, Alberta

EUB Applications No. 960313, 960314, and 960677

Cardinal River Coals Ltd.
and TransAlta Utilities Corporation

June 1997

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TABLE 1

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APPENDICES

1 INTRODUCTION

In March 1996, Cardinal River Coals Ltd. (CRC) submitted Applications No. 960313 and 960314 to the Alberta Energy and Utilities Board (EUB) for approvals with respect to a proposed coal mine and coal processing plant (Cheviot Coal Project) under Sections 10(1)(b) and 23(1)(a) of the Coal Conservation Act. Included with these applications was an Environmental Impact Assessment (EIA), submitted in accordance with the Alberta Environmental Protection and Enhancement Act (AEPEA). At the same time, the Federal Department of Fisheries and Oceans (DFO) was advised by CRC of its intention to apply for authorization under Section 35(2) of the Fisheries Act.

On 21 August 1996, TransAlta Utilities Corporation (TransAlta) submitted Application No. 960677 to the EUB in respect to the proposed transmission line and associated substation, as per Sections 12, 14, and 17 of the Hydro and Electric Energy Act.

This report constitutes the decisions of the Joint Review Panel (the Panel) on matters that fall under the jurisdiction of the EUB, and the recommendations of the Panel to the Federal Ministers of the Environment and Fisheries and Oceans on matters that fall under the jurisdiction of the federal government and, more specifically, under the jurisdiction of the Canadian Environmental Assessment Act (CEA Act) and the Fisheries Act, with regard to the Cheviot Coal Project.

1.1 Project Summary

The Cheviot Coal Project is a proposal by CRC for the construction, operation, and decommissioning of a coal processing plant; the development, operation, and reclamation of an open pit coal mine; the restoration of the Mountain Park subdivision rail line; the upgrading of the existing access road (the Grave Flats Road) into the Cheviot mine area; and the installation of a new transmission line and substation to supply electrical power to the Cheviot mine.

The Cheviot Coal Project (Figure 1) is located in the Rocky Mountains of west–central Alberta approximately 320 kilometres (km) west of the City of Edmonton and 70 km south of the Town of Hinton. Proposed open pit mining would be centred around the former community of Mountain Park (Figure 2), approximately 20 km south-east of CRC's existing Luscar mine and 12 km south of the Hamlet of Cadomin. A Treaty Land Entitlement has recently been awarded to the Alexis First Nation immediately south and east of the Cheviot mine area, and the Smallboy Camp is located approximately 15 km east of the mine boundary (see Figure 3). The western

edge of the proposed mine permit boundary lies 2.8 km east of the Jasper National Park boundary.

The Cheviot mine permit area is approximately 23 km long and 3.5 km wide and located within an east–west trending valley. Terrain within the valley is hilly, with elevations between 1700 and 2000 metres (m). The eastern third of the permit area drains to the south and east along Red Cap Creek into the Cardinal River and ultimately the Saskatchewan River system. The western portions of the proposed permit area are drained to the north by the McLeod River system into the Athabasca River and ultimately the Mackenzie River system. The Cardinal Divide ridge is a dominant topographic feature to the south, while the western edge of the proposed mine permit boundary extends into the front range of the Rocky Mountains to an elevation of 2200 m. The north and east limits of the development are bounded by Cadomin Mountain and Red Cap Mountain (Nikanassin Range).

Mining activity had been carried out within the proposed mine permit boundary from the early 1900s until the 1950s, and was centred around the former townsite of Mountain Park. Mining during this period was primarily underground, although some minor surface mining was also conducted. No reclamation of these mining activities has been carried out.

1.2 Approval Process

In Alberta, the development of a coal mine is based upon a two-stage approval process. The first provincial approval (or permitting) stage deals primarily with the conceptual plans for the mine project as a whole. This stage is carried out under the disclosure requirements of the Coal Development Policy for Alberta, the EIA requirements of Alberta Environmental Protection (AEP), and the permit requirements of the EUB. In the case of the Cheviot Coal Project, a federal approval from the DFO is also required. These various processes are described in greater detail below.

The second stage of the approval process, generally referred to as the licensing stage, is designed to examine, on an individual basis and in much greater detail, the specific components of the project. These include licences from the EUB for individual pits and rock dumps, as well as more detailed approvals from AEP for air and water emissions and reclamation plans.

The two-stage approval process for coal mine projects is designed to first look at, on a broad-scale basis, the full range of likely environmental and technical issues associated with a project, and in so doing, set broad boundaries for acceptable development scenarios. The second stage is intended to allow for site-specific changes to the broader conceptual plans approved during the first stage. The presence of the second stage recognizes the inherent difficulty for a company in predicting the optimal pit, highwall, waste dump, and reclamation program designs prior to accurately establishing the actual extent and distribution of the coal resources. The presence of the licensing stage helps to ensure that both resource conservation and environmental protection are optimized in a manner not possible during the permitting stage.

1.2.1 Coal Development Policy for Alberta (1976)

The Coal Development Policy for Alberta is designed to bring about and maintain the maximum benefits of the province's coal resources for the people of Alberta. A fundamental principle of the Coal Development Policy is that no development will be permitted unless the Alberta

Government is satisfied that it may proceed without irreparable harm to the environment and with satisfactory reclamation of any disturbed land.

The Coal Development Policy provides a classification of provincial lands into four categories based on: their relative environmental sensitivity; the range of alternate land uses; the potential coal resources; and the extent of existing development of townsites and transportation facilities.

The Coal Development Policy also provides for a four-step screening and approval process for coal mines which includes:

(1) preliminary disclosure to government,

(2) disclosure by the applicant to the public,

(3) consideration of a formal application through a public hearing, and

(4) a final decision by the government.

CRC submitted a preliminary disclosure, as required by the Coal Development Policy, to the Government of Alberta and in December 1985 received approval in principle to proceed to the next stage of the approval process.

1.2.2 Alberta Environmental Protection

The Cheviot Coal Project includes both a surface mine producing a projected 3.2 million tonnes of coal per year and a coal processing plant. As a result, it is a mandatory project as set out under the Environmental Assessment Regulations of the AEPEA and so requires the preparation of an EIA.

A draft Terms of Reference for the EIA was developed jointly between both the federal and provincial governments and CRC. These were made available to the public for review in October 1994. After receipt of comments, the Terms of Reference were finalized and published by the Alberta Director of Environmental Assessment on 23 January 1995. The EIA was submitted by CRC in March 1996 to the EUB as one component of its application. Following the review of the EIA, AEP's Director of Environmental Assessment advised the EUB on 18 September 1996 that the EIA now addressed the requirements set out in Section 47 of the AEPEA and in the final Terms of Reference. The Director also advised the EUB that the EIA report was complete pursuant to Section 51 of the AEPEA.

1.2.3 Alberta Energy and Utilities Board

Under Section 10(1)(b) of the Coal Conservation Act, no person shall develop a mine site without first applying for, and obtaining, a permit from the EUB. Similarly, under Section 23(1)(a) of the Coal Conservation Act, no person shall construct or begin operations at a new coal processing plant without applying for, and obtaining, an approval from the EUB. A permit and licence from the EUB are also required under Sections 12, 14, and 17 of the Hydro and Electric Energy Act in order to construct and operate a new transmission line and to operate a new substation.

The processing of applications made by companies to the EUB is guided by the requirements of the Energy Resources Conservation Act (ERCA) and the associated Rules of Practice. Section 29(2) of the ERCA requires that, if it appears to the EUB that its decision on an application may directly and adversely affect the rights of a person, the EUB provide: (1) notice of the application; (2) an opportunity for learning the facts regarding the application; and (3) an opportunity to cross-examine the applicant and to present evidence and argument to the EUB.

The Rules of Practice provide direction on procedures, including the provision of notice, submissions by interveners, and the presentation of submissions. By agreement between the EUB and the Canadian Environmental Assessment Agency (CEAA), the EUB Rules of Practice governed the procedures followed by the Panel in addressing these applications.

1.2.4 Federal Department of Fisheries and Oceans/ Federal Department of the Environment/ Canadian Environmental Assessment Agency

Section 35(2) of the Fisheries Act requires that an authorization be obtained from the Minister of Fisheries and Oceans prior to the alteration, disruption, or destruction of fish habitat. Under the CEA Act, prior to issuing such an authorization, an environmental assessment of the project must be undertaken. Following notification by CRC as to its intention to apply for the above authorization, the DFO, as a Responsible Authority under the CEA Act, initiated a review of the proposed project. In a letter dated 26 August 1996 to the Minister of the Environment, the Minister of Fisheries and Oceans stated that, following a review of CRC's environmental information, the DFO had determined that the project may potentially result in significant adverse environmental effects. In order to expedite the review process, the Minister of Fisheries and Oceans recommended that the Cheviot Coal Project should be referred by the Minister of the Environment for review by a panel and further recommended, in the spirit of the 1993 Canada/Alberta Harmonization Agreement for Environmental Assessment, that the CEAA attempt to integrate this panel review through a Joint Review Panel, with any hearing process required by the EUB.

Sections 40 and 41 of the CEA Act provide for the establishment and appointment of a Joint Review Panel and for the factors to be considered by a Joint Review Panel.

1.3 Public Review Processes

1.3.1 EUB Review Process

On 16 July 1996, a Notice of Filing was published by the EUB, advising the public how and where it could obtain a copy of CRC's application, including the EIA. On 25 September 1996, the EUB published a Notice of Hearing, advising the public that the EUB had scheduled a public hearing of the CRC and TransAlta applications in the Town of Hinton on 25 November 1996. The public were also advised that the scheduled public hearing could, subject to agreement being reached between the EUB and CEAA, be substituted with a hearing held under the auspices of a Joint Review Panel.

In response to questions raised by the public, the EUB scheduled a pre-hearing meeting for 5 November 1996, in Hinton, Alberta. Notice of the pre-hearing meeting was issued on 10 October 1996. At the pre-hearing meeting, the issues addressed included timing of the

hearing, the availability of intervener funding, and the Joint Review Panel process. A Memorandum of Decision was issued by the EUB on 27 November 1996 and is included as Appendix A. In the Memorandum of Decision the hearing was rescheduled to 13 January 1997, with written submissions to be made by interested parties on or before 7 January 1997.

1.3.2 Joint Review Panel Process

The EUB's review process for the Cheviot Coal Project was initiated by the EUB prior to the implementation of the Joint Review Panel process. Negotiations on the form and structure of a joint federal–provincial review of the Cheviot Coal Project were formally initiated in July 1996. On 5 September 1996, a draft agreement between CEAA and the EUB was released to the public and public comments were sought on or before 4 October 1996. Comments from the public, as well as government agencies, were incorporated and on 24 October 1996 the EUB executed the agreement with CEAA for the operation of the Joint Review Panel for the Cheviot Coal Project. This agreement covered the constitution of the Joint Review Panel, the factors to be considered by the Joint Review Panel, and the conduct of the hearing. The agreement, together with the Terms of Reference and the factors to be considered by the Joint Review Panel, are included as Appendix B.

In a letter dated 16 September 1996, the Chair of the EUB advised the CEAA that Dr. Brian F. Bietz and Mr. Gordon J. Miller had been selected to sit as the EUB Division (i.e. Panel members) for the public hearings into the Cheviot Coal Project, with Dr. Bietz to chair. By letter dated 22 October 1996, the Federal Minister of the Environment also appointed Dr. Bietz and Mr. Miller as Chair and Member, respectively of the Joint Review Panel. Dr. Tom Beck was subsequently appointed by the Minister of the Environment as the third Member of the Panel. Dr. Beck was then also appointed by a Provincial Order-in-Council as an Acting EUB Board Member and assigned by the Chair of the EUB on 27 November 1996 to the Division of the EUB scheduled to hear the Cheviot Coal Project.
On 28 November 1996, the Joint Review Panel (the Panel) issued a notice confirming its agreement with the 13 January 1997 as the date for public hearings into the Cheviot Coal Project.

1.3.3 Public Hearing

The public hearing of the Cheviot Coal Project was held at the Crestwood Hotel in Hinton, Alberta from 13 January to 20 February 1997 inclusive and re-opened on 10 April 1997 for one day. Organizations and individuals who attended and participated in the hearing are listed in Table 1.

The hearing was re–opened on 10 April 1997 in order to consider a report by Norwest Consultants, who were retained by the Panel to provide advice on certain aspects of the proposed mine plan.

1.3.4 Decision–Making Process

There are significant differences worth noting in the role of the Panel in a combined provincial and federal decision–making process. Under the Alberta provincial statutes, the Panel is charged with determining whether a proposed energy development is in the public interest. In making its determination as to whether a project is in the public interest, the Panel is required to consider a

range of factors, including resource conservation, safety, economic and social impacts of the project, and effects on the environment. Its decision, including reasons, is documented in a Decision Report.

Under the CEA Act, the Panel is required to submit to the Minister of the Environment and to the Responsible Authority (in this case DFO) a report which provides its rationale, conclusions, and recommendations relating to the environmental assessment of the project, including any mitigation measures and follow-up programs. No decision on federal issues is made by the Panel. Section 37 of the CEA Act authorizes the Responsible Authority to exercise its power to allow a project to proceed if, taking into account the report submitted by a review panel and any mitigation measures, its adverse environmental effects are deemed to be insignificant or, if they are significant, felt to be justified in the circumstances.

As per the agreement between the EUB and CEAA, the Panel intends to issue a single Decision Report designed to meet the requirements of both levels of government.

1.4 Public Consultation Process

1.4.1 AEP and EUB Requirements

The AEP and EUB expectations for public consultation by CRC and TransAlta were outlined in the EIA Terms of Reference issued on 23 January 1996. It was expected that the proponent's public consultation program would inform members of the public who may be affected by the project of the development plans, provide opportunities to express their concerns with those plans, and allow them to contribute to the preparation of the EIA. Members of the public were expected to include: Cadomin/Hinton/Edson residents, commercial and recreational land users, and aboriginal peoples.

1.4.2 CEAA Requirements

Through the CEA Act, the Government of Canada has committed to facilitating public participation in the environmental assessment of projects requiring its approval, and to providing access to information on which the assessment is made. These requirements were incorporated by the Government of Canada into the EIA Terms of Reference in order to ensure that the proponent's public consultation program satisfied the requirements of the CEA Act.

1.4.3 Activities of the Applicants

CRC and TransAlta's public consultation program concentrated on the area generally known and identified as the Coal Branch Area in west–central Alberta. A formal press announcement, radio announcements, and a direct mail out to 50 individuals and groups with respect to the Cheviot Coal Project were made on or about 13 October 1994.

Between October 1994 and March 1996, CRC and TransAlta held approximately 160 meetings with various public participants and regulatory officials in an attempt to identify pertinent environmental concerns, as well as means for mitigating environmental effects. Methods of involving the public included: direct contact between CRC/TransAlta staff, their consultants, and the public; open house meetings; direct mailing of information to 928 locations, and field tours.

In April 1996 CRC held a public disclosure meeting, as required by the Coal Development Policy for Alberta.

1.5 Report Framework

1.5.1 Format

For both convenience and clarity, the report will generally follow the format of issues that the Panel must address, as set out by Schedule 1, Appendix 1 of the Terms of Reference (Appendix B of this report). The report is broken into eight sections which address, respectively, the following broad issues:

(1) Introduction

(2) Project Purpose, Need, and Alternatives

(3) Aquatic Environmental Effects

(4) Terrestrial Environmental Effects

(5) Atmospheric Environmental Effects

(6) Land Use Effects

(7) Community Effects

(8) Conclusions, Decisions, and Recommendations

Sections 2 through 7 summarize the views of the applicants, the views of the interveners who commented on a particular issue, and the views of the Panel. Sections 3 through 7 also address, as appropriate:

(1) the study area considered;

(2) the existing environmental conditions, including socio–economic conditions;

(3) the expected environmental effects of the various project components or alternatives on the factor being considered, including their temporal and spatial boundaries and significance;

(4) the need for, and requirements of any follow-up and monitoring programs felt appropriate;

(5) the effects of accidents or malfunctions;

(6) the capacity of affected renewable resources to meet future needs; and

(7) cumulative environmental effects.

It should be noted that, in preparing this report, the Panel has exercised its judgement in determining the extent to which each of the above general subjects applies to a particular component of the Cheviot Coal Project, and has specifically commented in the report on only those issues relevant to its task.

1.5.2 Environmental Assessment Process

The Agreement between the EUB and CEAA (Appendix B) provides a brief outline of the issues which are expected to be considered by the Panel. However, a number of terms (e.g. the spatial and temporal boundaries of environmental effects; cumulative environmental effects; and the significance of environmental effects) are not defined. In its application, CRC set out in some detail the approach it had adopted in assessing the significance of any adverse environmental effects potentially resulting from the Cheviot Coal Project, as well as their temporal and spatial boundaries and the cumulative environmental effects of their proposed project in conjunction with other activities in the region. Many of CRC's views and assumptions were questioned at the hearing by various interveners. As well, CRC, in its EIA, has made use of the concept of Valued Environmental Components (VECs) in its analysis of environmental effects. In order to ensure that there is a common understanding of the Panel's interpretation of these concepts, a brief discussion of each was felt appropriate.

It is worth noting that the Panel does not believe that the discussion below either can or should be binding on future tribunals tasked with addressing public interest issues. While the Panel believes that the approach taken here is valid to the Cheviot Coal Project, clearly other approaches to assessing the environmental effects of a project may be equally if not more appropriate.

Valued Environmental Components

VECs have been defined by CRC as "those environmental attributes associated with the proposed project development, which have been identified to be of concern by either the public, government, or the professional community". Physical (e.g. groundwater, air quality), biological (e.g. fish, vegetation, ungulates), and social/economic (e.g. forestry, public health, recreation) components of the environment were included by CRC in its selection of VECs, in part in response, CRC noted, to the broad–based definition of environmental effects found in both provincial and federal legislation. The use of VECs was intended to help ensure that the EIA process is focused on relevant issues.

The Panel believes that the use of VECs is appropriate for the Cheviot Coal Project. In particular, the Panel accepts that their use can minimize unnecessary effort to assess issues of likely little relevance, and ensure that the efforts of the applicant, the interested publics, and the government review agencies alike are focused on key questions. Furthermore, the results of analyses of VECs, if properly done, can reasonably be expected to be applicable to a broader range of environmental parameters.

Spatial and Temporal Boundaries

CRC noted that the Cheviot Coal Project has the potential to affect various VECs over a range of distances from the actual sources of disturbance as well as over a number of time periods of various lengths. In preparing the EIA, CRC indicated that it has generally attempted to describe the aerial extent of a predicted impact (i.e. its spatial boundary), as well as the time period over which CRC predicted that such impacts will occur (i.e. its temporal boundary). The Panel notes that while CRC initially attempted to provide some broader definitions of these two terms, it is evident from the EIA that both the spatial and temporal boundaries of environmental effects ultimately tended to be highly specific to: first, the actual components of the Cheviot Coal Project (e.g. the transportation and utilities corridor, the coal processing plant, or the surface mine); second, the project phase (e.g. construction, operation, or decommissioning); and third, the particular VEC under consideration (e.g. water quality, vegetation, or carnivores). The Panel, therefore, has also not attempted to set broad definitions for either the spatial or temporal boundaries of environmental effects, but rather has considered the evidence as presented for each VEC.

Significance of Environmental Effects

While recognizing that this is somewhat of an over simplification, the Panel believes that the environmental effects arising from the Cheviot Coal Project can be placed, for all practical purposes, into one of three general categories. These are:

(1) changes to the numbers of organisms, including both flora and fauna, found in the environment and their relative proportions to each other;

(2) changes to the physical properties, including water, air, and soil, of the environment and their interactions; and

(3) changes to the human use of the environment, for aesthetic, spiritual, recreational, economic, or any other purpose.

For each of these three categories, the parameters which define when an environmental effect is significant are clearly different. In assessing whether an environmental effect of the Cheviot Coal Project is significant, the Panel has, when appropriate, used the following general criteria:

(1) For organisms, an environmental effect was generally considered to be significant when the changes induced by the Cheviot Coal Project are beyond the normal range of natural variation in the population size of that organism or group of organisms **and** the effects on population size will continue beyond the life of the Cheviot Coal Project into the foreseeable future. The term population is based on the biological definition of population; that is, a geographically distinct assemblage of members of a species, usually capable of successful reproduction.

(2) For the physical properties of the environment, an environmental effect of the Cheviot Coal Project would normally be considered to be significant when either the mean value of the physical property or its normal range of variation is altered to the point that this results in either a reduced carrying capacity of the environment for biological VECs, or a

risk to human health or safety.

(3) For human use, an environmental effect resulting from the Cheviot Coal Project would usually be considered to be significant if it results in a permanent loss of an area or region where an activity was historically carried out and where other comparable areas cannot be readily substituted.

Where particular issues did not clearly fall into any of the above categories, the Panel has used its professional judgement in its assessment of the significance of environmental effects. For example, an environmental effect may be deemed significant if it precludes organisms from returning to an area where they previously occurred or alternatively precludes some reasonably likely future human use. Clearly a greater degree of judgement regarding whether these alternative events have a reasonable probability of occurring and their importance, if they did, must be applied. It is worth noting that while all of the environmental effects described above result in negative impacts, the same model can be applied when the environmental effects result in a net positive change.

In its application, CRC stated that it had considered the affects of its mitigation measures prior to determing environmental significance, an approach which was questioned by some parties at the hearing. The Panel, in its assessment of the Cheviot Coal Project, believes that the significance of environmental effects can only be realistically determined after mitigation has been incorporated into the project design. In this case, this would include the mitigation measures required by the Panel and other regulatory agencies in addition to those proposed by CRC.

Cumulative Environmental Effects

Both provincial and federal EIA legislation require a proponent to assess the cumulative environmental effects of its proposed project. In recent years, a considerable amount of debate has occurred regarding how cumulative environmental effects should be defined and assessed, but a number of questions remain. In this case, CRC's approach to addressing cumulative effects was also challenged by some interveners.

For the purposes of this review the Panel believes that, ideally, in order to carry out a cumulative effects assessment (CEA) of the Cheviot Coal Project, it is necessary to first have some knowledge of the historic status of each VEC that may be affected by the project (e.g. what was its past distribution and occurrence? Were these attributes stable or variable?). The second step is to understand its current status (e.g. has its distribution and occurrence changed? Are these attributes more or less variable?). The third step is to ascertain why those changes, if any, have occurred (e.g. are they caused by normal biological, physical, or social processes? Or, are they due to anthropogenic or some other unique forces?)

Based upon this description of existing conditions, the fourth step in the process is to estimate the likely incremental effects of the proposed project on the VEC, both in absolute terms as well as on its degree of variability. The final step is to identify any other reasonable factors, particularly other projects or developments which, if they also occur, will also have an effect on the VEC, and what their incremental effects either alone or combined might be.

In carrying out its review, the Panel has, either explicitly or implicitly, applied the above criteria to the information provided by CRC in its application. In those cases where the data base is incomplete or of questionable quality, the Panel has used its professional judgement as appropriate. The Panel has then attempted to assess, within the context of the full range of project benefits and costs:

(1) whether the incremental changes in a VEC created by the Cheviot Coal Project are significant;

(2) if they are significant, whether they are justified from a public interest perspective; and

(3) if they are justified, whether the incremental changes in a VEC create a significant risk that other development opportunities may need to be foregone.

1.6 Preliminary Matters

At the outset of the public hearing, a number of preliminary matters were raised. Other procedural matters were raised during the hearing. These are addressed below.

1.6.1 Change of Venue

In a letter dated 18 December 1996, the RMEC stated that a change in venue for the hearing was needed, due to a concern that strong public sentiment in the Hinton region could prevent fair and complete participation in the public hearing process, particularly by those opposed to the Cheviot Coal Project.

The Panel, however, did not agree that such a change was either needed or in the overall public interest. The motion was denied.

1.6.2 Establishment of the Joint Review Panel

The RMEC took the position that certain sections of the CEA Act, notably sections 15(1), 16(3), and 33(b)(2) set out mandatory requirements that the Federal Minister of the Environment must meet before a federal review panel can be properly established. RMEC was of the view that, in the case of the Cheviot Coal Project Joint Review Panel, these requirements had not been met and that the current Panel was improperly constituted.

The Panel, in deciding against the RMEC's motion, noted that the CEA Act had clearly anticipated two forms of panel, that is "panel reviews" (Sections 29 and 33 to 35) and " joint panel reviews" (Sections 40 through 42). The view of the Panel was that, despite the similarity in their names, the legislation clearly contemplated differences in the two processes. Since the Panel had been constituted as a Joint Review Panel, the position taken was that it only needed to assure itself that the requirements set out under Sections 40, 41, and 42 of the CEA Act had been met. The Panel re-examined those requirements and, based on the results of that review, assured itself that to the best of its knowledge, the legislative requirements had been met.

1.6.3 Public Registry

The third issue raised by the RMEC was whether the Public Registry for documents, a requirement under the CEA Act, had been operated in a fashion which in some way prevented public access to information in a manner inconsistent with the requirements of Section 55 of the CEA Act. In particular, it was argued that the presence of a $6 service fee and the unavailability of certain documents when initially requested produced unacceptable barriers to effective participation in the hearing by the public. As a result, the RMEC argued that the hearing should be adjourned until this problem had been adequately rectified.

In reviewing the various facts provided by the RMEC regarding the operation of the Public Registry, the Panel was not convinced that the RMEC had been treated unfairly nor that it had been denied a reasonable opportunity to review the various pieces of evidence needed to examine the application or that the Panel might use in reaching its conclusions. The motion to adjourn was denied. Judicial review of this decision was sought by RMEC in the Federal Court of Canada. The Federal Court of Canada, on two occasions, dismissed RMEC's application.

1.6.4 Institutional Bias

The RMEC argued that because two of the Joint Review Panel members had originally sat as an EUB Division at the pre-hearing meeting held on 5 November 1996 and had, as members of the Joint Review Panel, subsequently ratified the decisions made by the EUB Division arising from that meeting, such a decision in fact had de facto fettered the authority of the Joint Review Panel and/or raised a suggestion of bias on the part of the members.

The Panel rejected this argument on several grounds. The key issue, however, was the fact that the establishment of the Joint Review Panel in no way diminished either the authority or the obligation of the Panel members to carry out their statutory mandates as set out under both provincial and federal legislation. The Panel found that, at the pre-hearing meeting, the EUB Division had properly carried out its obligations as set out in the EUB's Rules of Practice. With the formation of the Joint Review Panel, the decisions made by the EUB Division were properly reviewed and accepted by the Joint Review Panel and, in doing so, the Panel was in no way fettered by previous decisions.

1.6.5 Adjournment Request

The AWA Coalition requested an adjournment of the hearing in a letter dated 6 January 1997 on the grounds that it had not had adequate time to prepare. CRC responded that the hearing had already been adjourned once and that a further adjournment would be unfair. The Panel rejected the AWA Coalition's request and found that 13 January 1997 was a fair and reasonable date to commence the hearings.

At the opening of the hearing on 13 January 1997, the AWA Coalition repeated its request for an adjournment, in this case noting that there were a number of documents, specifically interventions by various parties to the hearing, that it would not receive until after the hearings had begun, and so it required more time to review these. The AWA Coalition also noted that because it was a volunteer group it had only limited resources available to carry out such a

review. CRC stated that its application had already been available for public review for several months and that it had carried out public consultation for over a two–year period.

The Panel again denied the adjournment request. The Panel indicated that it should be possible to seat the first two CRC witness panels without unfairly compromising the AWA Coalition's ability to carry out cross–examination. The Panel did advise, however, that should this not prove to be the case, it was prepared to reconsider the motion. The following day, the AWA Coalition raised the issue again, noting in particular that it had been unable to obtain complete copies of the submissions of the Federal Government of Canada. Based on this, the Panel agreed with the request and provided an adjournment.

On 4 April 1997, in the context of a proposed re–opening of the hearing, the AWA Coalition requested an adjournment to allow for more time to review the Norwest Consultant's report on CRC's conceptual mine plan. The Panel did not accept that additional review time was warranted. The AWA Coalition reiterated its concerns with respect to preparation time at the re-opening of the hearing on 10 April 1997.

1.6.6 Expert Advice

The AWA Coalition suggested on a number of occasions during the hearing that the Panel may need to gain additional independent technical advice on a number of issues, most notably fisheries, conservation biology, and social benefit-cost analysis. The Panel reserved any decision on those suggestions, and ultimately did decide that it required independent expert advice on the subject of mine planning and the proposed extent of CRC's external rock waste dumps. This advice was addressed during the re-opening of the hearing on 10 April 1997.

1.6.7 Site Visit

The AWA Coalition requested that the Panel carry out a site visit during the hearing. The Panel concurred and a helicopter view of the proposed mine site was carried out on 12 February 1997.

1.6.8 Production Of Witnesses

Prior to the testimony of the Government of Alberta, the AWA Coalition requested that the Province provide a witness from the Parks and Natural Heritage Division of AEP with specific expertise in the Cadomin Caves and the Cardinal Divide Natural Areas.

In considering the request, the Panel noted that AEP intended to seat a full panel of expert witnesses. Given that there seemed to be a reasonable opportunity to examine the evidence adduced by AEP at the hearing, the Panel determined that it was not prepared to grant the motion.

1.6.9 Production of Documents

The AWA Coalition requested that the Panel require the Government of Alberta to produce copies of the preliminary disclosure documents, prepared under the requirements of the Coal Development Policy of Alberta, for a number of other surface coal mines which had been proposed in the region. The Government of Alberta advised the Panel that those documents had, in its view, been submitted in confidence and so could not be released, except perhaps under a

request under the Freedom of Information and Protection of Privacy Act. The Government also noted that the documents were dated, with some being submitted in the mid-1970s, and that without someone to speak to them, it would not be possible to determine if the various proposals remained relevant.

The Panel determined that, given the expectation of the parties that the documents were submitted in confidence and, more importantly, the inability of anyone, including the applicant, to test the relevance of the documents, it was not prepared to attempt to compel that the documents be submitted to the hearing.

2 PROJECT PURPOSE, NEED, AND ALTERNATIVES

2.1 Proposed Cheviot Coal Project

2.1.1 Views of the Applicant

CRC noted that the Cheviot Coal Project was intended to eventually replace its current mining operations at the existing CRC Luscar mine. CRC advised that the reserves of coal at the Luscar mine will be sufficient to maintain present production levels (i.e. 3 million tonnes per year) only until the year 2000 and will be exhausted by 2001–2003. It proposed developing the Cheviot reserves in order to produce approximately 3.2 million tonnes of clean coal annually for at least 20 years, with production slated to begin in 1999 in order to allow a smooth transition of activities from the Luscar mine to the Cheviot mine. The coal from the Cheviot mine would be destined primarily for the Pacific Rim metallurgical coal market. CRC advised that it had no signed contracts with respect to the proposed production from the Cheviot mine. However, CRC referred to its unique achievement of maintaining an "AA" coal quality rating from the steel mills which purchased its coal as evidence of the company's success in the international coal trade and to support its confidence that existing Luscar mine contracts would be continued with Cheviot mine coal.

The CRC application for a mine permit encompasses approximately 7430 hectares (ha) of land in Townships 45 and 46, Ranges 22, 23, and 24, West of the 5th Meridian (Figure 2). CRC stated that the project was based almost entirely on coal leased to Luscar Ltd., one of its joint venture partners. CRC advised that an additional 101 ha of coal (Sections 35, 36-24-45 W5M) are leased to two private citizens, who currently reside in British Columbia. CRC advised that it currently was in discussion with these lease holders with a view to obtaining their agreement for CRC to include these leases in the development proposal.

CRC advised that it had considered three possible scenarios to address the declining reserves at the Luscar mine. These were: (1) to take no action and allow mining operations to end; (2) to purchase another mine within the region; or (3) to develop another CRC/Luscar property. CRC considered that the first option was not viable due to its reluctance to forego the continued opportunity to meet a market need for high quality metallurgical coal which it had historically been able to fill with a high degree of success. The second scenario was also not a viable option in CRC's view due to the absence of properties available for purchase.

With respect to the last scenario, CRC indicated that it had considered developing the coal resources of Cadomin East, a lease holding that lay immediately east of the Hamlet of Cadomin, or possibly accessing additional reserves at the existing Luscar mine site using underground mining techniques. In CRC's view, the reserves at Cadomin East were too small (less than 6 million tonnes) to sustain a long–term development. CRC also noted that the Hamlet of Cadomin had expressed a number of concerns, none of which had been resolved, regarding the possible development of the Cadomin East reserves. With respect to the remaining underground reserves at the Luscar mine site, CRC had concluded that the small amount of reserves (9.5 million tonnes), together with CRC's lack of underground mining experience, did not make this a viable development option.

CRC indicated that it had also considered developing other CRC/Luscar lease options at Folding

Mountain, Brule, and Muskiki Lake/Race Creek/South Esk, respectively, and that it had concluded that factors such as insufficient drilling information, unfavourable zoning, and a considerable distance from infrastructure rendered these properties as also not being viable options, particularly when compared to the Cheviot mine where approximately 70 million clean tonnes of mineable coal had been confirmed.

CRC said that approval of the Cheviot Coal Project would also allow for the efficient transfer of its workforce from the existing Luscar mine. It pointed to the achievements of the company and the workers' union in the fields of safety and labour relations as evidence of CRC being a responsible company and employer. CRC noted that in 1982 it had received the first reclamation certificate issued in the province and had subsequently been the recipient of government and industry association awards with respect to reclamation and wildlife enhancement. The company stated that approval of the Cheviot Coal Project would help assure the existing economic and social benefits to the surrounding communities, particularly Hinton. CRC also noted that all provincial zoning policies, including the Coal Development Policy for Alberta (1976), the Eastern Slopes Policy (1984), and the Coal Branch Sub-Regional Integrated Resource Plan (1990) recognize the importance of, and make provision for, coal development in the Cheviot area. CRC's position was that the Cheviot Coal Project was clearly its most favourable option with respect to reserves, zoning, and proximity to infrastructure.

2.1.2 Views of the Interveners

At the hearing, a large number of interveners advised the Panel that they supported CRC and TransAlta in their applications. These included: the Town of Hinton; the Alberta Chamber of Commerce; the Hinton and District Chamber of Commerce; the United Mine Workers of America (UMWA); Mr. Van Binsbergen, the Member of the Legislative Assembly (MLA) for West Yellowhead; Mr. Breitkreuz, the Member of Parliament (MP) for Yellowhead; Mr. J. D. Clark; Canadian National Railway; Weldwood Canada; and Inland Cement. Several noted CRC's long history of successful operations in the region and indicated that they were confident that this would continue into the future. The Alexis First Nation indicated that, based on the undertakings made by CRC to the Alexis First Nation, they also supported CRC's application.

A number of other interveners at the hearing took the position that, while they had concerns with specific components of the Cheviot Coal Project and wished to see some changes, they did not, in principle, oppose the application. These included: the Alpine Club of Canada/Alberta Native Plant Council (Alpine Club Coalition), the Mountain Park Environmental Protection and Heritage Association (Mountain Park Association), Alberta Fish and Game Association, and Trout Unlimited.

CEPA took no position with regard to the need for the Cheviot mine. However, CEPA advised the Panel that the Hamlet of Cadomin was the community that would be most directly impacted by the development of Cadomin East. Without a significant degree of further discussion and analysis, the community was not prepared to accept Cadomin East as an alternative to the Cheviot Coal Project.

With regard to underground mining, the UMWA Local 1656 confirmed that their membership had neither expertise nor training in underground mining and furthermore, in their view, underground mining was both very difficult and dangerous. The inherent concerns associated with previous underground mining operations in the Coal Branch were also raised by the

Mountain Park Association.

The AWA Coalition argued that CRC had not adequately justified its need to develop the Cheviot mine site, given its potential impacts on the environment. In particular, the AWA Coalition had significant concerns regarding the economic viability of the Cheviot Coal Project and categorized it as being, at best, uncertain. It claimed that CRC had not provided sufficient information for the Panel to be able to assess the risk of project failure. In particular, CRC had not provided a sensitivity analysis related to the effect on the economic viability of the project from any future decrease in demand for metallurgical coal. The AWA Coalition noted that the Japanese use of coking coal had reduced from 65.1 million to 36 million tonnes between 1981 and 1995 and was forecasted to decrease to 27.7 million tonnes by the year 2000. Since the Japanese were a major customer, unforeseen declines in their demand would, in the view of the AWA Coalition, represent a significant risk to the success of the project. The AWA Coalition also noted that CRC had not provided any information related to the effects of variability in the annual production rates from the Cheviot Coal Project on the viability of the project, or its sensitivity to further declines in the price paid for coal. The AWA Coalition noted that the prices used by CRC for planning purposes are among the highest seen in the last decade.

With regard to the project costs and benefits, the AWA Coalition noted that CRC had failed to provide any data, either in its application or at the hearing, on either operating or reclamation costs and the impacts of increases in those costs, nor had it provided any evidence of contracts for the Cheviot coal. The AWA Coalition stated that CRC's economic analysis had also not included any analysis of the risk that public dollars may be needed to maintain its operations or the risk, should the project fail, to the public for clean–up costs. Nor had CRC included various public costs such as costs to the municipality for road maintenance past the life of the project and costs for regulatory services. Finally, the AWA Coalition did not believe that CRC had adequately addressed, in assessing the need for the project, the range of environmental and social costs which the project would impose.

The AWA Coalition noted that CRC's proposal to continue large scale resource extraction in the area did not promote either economic diversification or long–term employment. They noted that the foregone employment in tourism and recreation, while smaller in total economic value in the near term, would continue indefinitely and could grow gradually. A number of other interveners to the hearing, most notably the RMEC, echoed the concerns raised by the AWA Coalition.

The AWA Coalition also noted concerns with CRC's competitive position. The AWA Coalition observed that CRC was proposing strip ratios (i.e. the ratio of overburden moved per tonne of coal mined) at the Cheviot Coal Project which were substantively higher than those used in other coal mines in Western Canada. The AWA Coalition argued that, since the moving of overburden is a significant component of mining costs, this placed the ability of CRC to compete with other North American coal mines into question. The AWA Coalition also suggested that the long–term economic viability of the Cheviot Coal Project was even further eroded by competition from Australian metallurgic coal mines. These mines, they argued, had significant economic advantages due to easier terrain to mine, shorter distances to tidewater, fewer environmental issues, and proximity to the main marketplace for metallurgical coals.

The AWA Coalition, in its intervention, identified a number of provincial, federal, and international government policies focused on both the preservation and conservation of natural

resources. These included: Alberta's Vision on Sustainable Development, the Alberta Coal Development Policy, the Alberta Revised Policy for Development of the Eastern Slopes, the Coal Branch Integrated Resource Plan, the Coal Branch Access Management Plan, the World Conservation Strategy, A Wildlife Policy for Canada, Federal Water Policy, Federal Policy on Wetlands Conservation, United Nations Convention on Biological Diversity, the Canadian Biodiversity Strategy, the National Task Force on the Environment and Economy, the National Parks Operational Policies, and the Alberta Fish and Wildlife Policy. As well, several pieces of relevant environmental legislation were referenced. In the view of the AWA Coalition, the Cheviot Coal Project was inconsistent with many of the basic premises and objectives of the above policies and legislation. Nor did the AWA Coalition believe that the Panel could depend on the lack of objection from the government agencies as an indication that a proposed project was consistent with government policy. The AWA Coalition stated that the Panel needed to consider such policies in considering the Cheviot Coal Project since they provided a measure of the public interest, as set out by elected officials, as well as a tool to measure whether environmental effects are adverse.

The AWA Coalition argued that it made more sense for CRC to delay development of the Cheviot Coal Project while it developed the remaining reserves at the Luscar mine which could be accessed through underground or hydraulic mining, and the reserves at Cadomin East. Both of these would be much closer to the existing Luscar mine infrastructure and so should greatly reduce development costs. The AWA Coalition noted that while CRC may not have extensive experience in underground mining, its joint venture partner, Consol Inc., certainly did. The AWA Coalition also believed that CRC had not provided the Panel with sufficient information to test whether the proposed alternatives represented technically, economically, and environmentally feasible alternatives to the proposed project. The AWA Coalition suggested that, based on these factors alone, the Panel could deny the applications.

2.1.3 Views of the Panel

In assessing the need for the proposed Cheviot Coal Project, the Panel notes that no intervener questioned whether CRC had obtained the mineral leases necessary for it to carry out mining activities, as proposed, within the mine permit boundary. The Panel does note, however, that there is a small area of coal leases in the western portion of the project area which are not controlled by CRC. While negotiations have not yet been finalized with the lease holders, the Panel has no reason to doubt that they are in support of their leases being mined by CRC. Therefore, the Panel accepts that CRC has established that, subject to its receiving the necessary provincial and federal approvals, it has the right to carry out extraction of the coal resources within the proposed mine permit boundaries.

The Panel notes that the AWA Coalition raised a number of questions regarding whether the Cheviot Coal Project is consistent with numerous international, national, and provincial policies which deal with integrated land planning and the protection of biological resources, including biodiversity. In reaching its decisions regarding the Cheviot Coal Project, the Panel intends to consider all evidence properly placed before it in determining whether approval of the Cheviot Coal Project is in the overall public interest, including relevant public policy. The Panel does agree with the AWA Coalition that it can and should look to such policies as one measure of the public interest, and has addressed this issue, where appropriate, throughout this report.

With regard to its existing mining operations, the Panel is prepared to accept CRC's contention that the Luscar mine is approaching the end of its economic life and that, for CRC to continue operations in the Hinton region, an alternative source of metallurgical coal will be needed. The Panel also believes that CRC has made a reasonable effort to evaluate and assess feasible alternatives to the proposed project. The Panel notes that no other lease holder came forward during the hearings to advise that it was willing to provide CRC with access to another source of coal or to propose an alternative to the Cheviot Coal Project. The Panel also accepts CRC's reticence and that of its employees to move to underground mining techniques or, given the concerns expressed by the Hamlet of Cadomin, to develop Cadomin East at this time, particularly given the relatively small amount of reserves associated with either option. The Panel also notes that development of the other coal leases currently held by CRC, even if economic, would also have associated environmental and social issues. The Panel does believe, despite the contention of the AWA Coalition, that it was provided with sufficient evidence to test whether the proposed alternatives were technically and environmentally feasible.

With respect to the Cheviot Coal Project itself, the Panel is prepared to accept CRC's estimates of coal reserves and coal quality, particularly given CRC's experience at the Luscar mine, as reasonable. The Panel notes that CRC is unable, through the provision of signed contracts, to provide any direct assurance that it will be able to market the coal it intends to produce. The Panel is also willing to accept the contention that demand for coking coal is very likely to decline in the Japanese market. However, the Panel notes that no party to the hearing contested CRC's contention that, because of the consistently high quality of its product, it would be able to continue to maintain market share. The Panel accepts CRC's view that, as an experienced and sophisticated entity in the international coal market, it will be able to successfully market the products of the Cheviot Coal Project.

It was claimed by several parties that not only was insufficient information provided by CRC's economic analysis for the Panel to confirm whether the Cheviot Coal Project was viable, but it was also not possible to determine the degree of future public liability for these costs. The Panel does agree that additional economic data would have been of value. However, during the hearing CRC indicated that, due to the highly competitive nature of the metallurgical coal industry, it was not prepared to release a great deal of information.

The Panel is prepared to accept CRC's contention that the Cheviot Coal Project will be, under reasonable price and market scenarios, economically viable. The Panel takes particular note, in reaching this decision, of CRC's ongoing operation of the Luscar mine for over two decades. While the Panel would have preferred to have additional economic data, the Panel is prepared to conclude that it is CRC that will bear the primary economic burden should the Cheviot Coal Project fail, and so approval of the project would not be contrary to the public interest for that reason.

The Panel also believes that the likely risks to the public associated with the project are acceptable. The Panel notes that, with the exception of the longer–term maintenance of the Grave Flats Road beyond the life of the mine, the Cheviot Coal Project does not appear to require any public funds for infrastructure costs. Some risk of public liability does exist should the project fail, but the Panel believes that this risk is minimal. The Panel notes that both partners in CRC are well established corporate entities and furthermore, that AEP requires monies to be set aside during the mining process to ensure that funds are available for reclamation.

The Panel is of the opinion that there may have been some confusion at the hearing with respect to the economic implications of the high strip ratios being proposed by CRC. The Panel is prepared to accept CRC's contention that, based on its existing knowledge of area geology, a strip ratio of 20:1 is feasible. However, the Panel is also of the view that, should mine development be approved, the company will be able to mine at substantially lower strip ratios if necessary. The benefit to the company in such a case would be reduced expenses. The cost to the company would be a corresponding reduction in the ultimately recoverable coal reserves and therefore the life the mine. Since such actions would also have resource conservation implications, the Panel notes that these issues would be closely monitored by the EUB during the mine licensing stage, since it is charged, among other things, with ensuring that resource conservation is optimized.

Based on the above findings, the Panel is prepared to accept that CRC has established a need for the Cheviot Coal Project. The Panel notes, however, that establishment of need does not automatically imply that the project is in the public interest or should ultimately be approved. The degree of environmental, social, and economic impact must also be assessed.

2.2 Proposed Surface Mine

2.2.1 Views of the Applicant

CRC stated that its conceptual mining plan for the Cheviot Coal Project called for the use of the same truck/shovel surface mining technology as presently employed at the Luscar mine. A series of individual open pits would be developed sequentially to meet both its production and reclamation objectives. CRC felt that the techniques and the experience gained in the steep terrain of the Luscar mine would be easily transferable to the primarily valley bottom Cheviot mine terrain. As noted earlier, in view of its lack of expertise in underground mining, CRC did not consider underground mining at the Cheviot mine as a suitable option.

CRC indicated that the waste rock removed to uncover the coal would be disposed of either by backfilling into already mined-out pits or into external waste rock dumps. In a number of instances, existing valley topography would be used for external dumps. Rock drains would be used in those cases, since many of these valleys contain small streams. Rock drains are intended to permit the unobstructed flow of water through the base of the waste rock dump. CRC noted that rock drain technology is currently employed at the Luscar mine and is a common practice in mountainous environments. The remaining rock disposed of externally to the pits would be placed into conventional dry land waste rock dumps.

In designing its conceptual mine plan CRC noted that, in order to satisfy certain customer requirements, it needed to produce on a continuous basis two specific levels of coal quality. In order to do this, it needed to mine two separate areas of the mine simultaneously. CRC said that it had considered mining the property from west to east in order to minimize the spread of disturbance over a broad area and perhaps also enjoy a more rapid return of the land to public use. However, the need to produce two products at the same time dictated the proposed plan of commencing development in two separate areas.

CRC advised that it was proposing that some of the excavated pits would not be backfilled with rock but rather would be allowed to fill with water. Lakes would be developed within the

completed pits (commonly referred to as end pit lakes), where the lack of material or mining logistics limited CRC's ability to backfill. CRC predicted that approximately 12 pits would be left in this condition.

Recognizing the historical and sentimental factors related to the former townsite of Mountain Park, CRC said that it had looked at avoiding mining activities within the townsite. However, the reserves of coal still remaining despite the earlier underground mining and the need for external waste rock dumping had resulted in some of the former townsite being impacted. CRC noted it had agreed with the Mountain Park Association that the Mountain Park cemetery should not be disturbed and that any disturbance adjacent to the cemetery should be minimized and reclaimed as soon as possible. In its proposed mine plan, CRC stated that it had ensured that public access would be maintained to the cemetery.
CRC advised that it had voluntarily relinquished to the government its coal leases at the eastern edge of the mine permit boundary. It had done so, it said, in order to hopefully expedite the settlement of the land claim of the Alexis First Nation.

2.2.2 Views of the Interveners

A number of interveners expressed concerns that CRC had not made sufficient effort to reduce the size of its external dumps. The Alpine Club Coalition requested that CRC be required to keep external waste rock disposal to a minimum and make more use of backfilling of the excavated pits than was currently proposed.

The Alberta Fish and Game Association also saw little justification for the use of external waste rock dumps to the extent proposed in the application. It suggested that CRC use in-pit backfill wherever possible, use dry-land dumps when external dumps cannot be avoided and, in the few cases where rock drains are justified, limit these to the upper reaches of streams where flows are intermittent and impacts on aquatic habitat would be minimal.

In its submission to the Panel, Environment Canada recommended that CRC's waste rock dumping plan be re-evaluated in order to minimize habitat disturbance and that important carnivore travel corridors/critical habitat remain protected on the lease area.

AEP, in its submission, noted that with respect to CRC's material handling plans, CRC would be required in its future applications for approvals under AEPEA to more accurately determine the extent to which surface and riparian disturbance could be further minimized, especially in areas where fisheries and wildlife habitat would be significantly impacted.

The Mountain Park Association expressed a strong concern with the levels of mining activity that were being proposed for the former townsite. They asked that CRC be required to re-examine its mine plans in greater detail in order to ensure that mining disturbance of the former townsite was kept to the minimum level possible

2.2.3 Views of the Panel

The Panel is prepared to accept that CRC's proposal to use surface mining techniques to remove the coal resources from its leases provides for the most economic recovery of these resources. In particular, the Panel notes that the use of surface mining technology will allow CRC to directly

transfer both technical expertise and equipment from the Luscar mine as operations there wind down. Ultimately, the experience gained by CRC in reclamation and wildlife habitat enhancement at the Luscar mine should also be applicable to the Cheviot Coal Project.

Based on the information provided by CRC at the hearing, the Panel was unable to assess whether CRC had taken sufficient steps to balance maximizing coal recovery against minimizing the total
area to be disturbed by surface mining activities. For this reason, an independent consultant was retained to evaluate CRC's conceptual mine plan.

Based in part on the advice from the consultant, the Panel is satisfied that the Cheviot Coal Project mine plan is based on sound economic and engineering assumptions and compares favourably to other western Canadian surface coal mine operations. The Panel accepts that, should the project be approved, the footprint of the proposed mine is not likely to be significantly greater than that presently envisaged by CRC. The Panel was encouraged by the efforts of CRC, as reported by the Panel's consultant, to continue to further refine its mine plan. There are indications that the footprint of the external waste rock dumps could be further reduced in a number of areas, thus lessening the effects on both aquatic and terrestrial habitat. Should the project be approved, the Panel would expect that the mine plan would continue to evolve and that further reduction in external waste rock dumps, particularly in the Prospect Creek, Powerhouse Creek, and MacKenzie Creek areas, would be actively explored by CRC.

With respect to the mine plan in the area of the former townsite of Mountain Park, the Panel notes the commitments made by CRC to avoid impacting the cemetery and minimizing, to the extent possible, impacts on the former townsite. The Panel concurs that protection of the cemetery from both disturbance and loss of access is required. The Panel also believes that as there are substantive coal reserves below the former townsite of Mountain Park, only partial protection of that site may be warranted. The issue of appropriate protection of the cemetery and the former townsite are discussed in Section 7.

2.3 Proposed Coal Processing Plant

2.3.1 Views of the Applicant

Coal produced at the Cheviot mine will require cleaning prior to shipment, and CRC proposed to construct a new coal preparation plant within the mine permit boundaries. CRC applied to locate its proposed coal processing plant within the Harris Creek drainage. The Harris Creek location would, in CRC's opinion, lower the visual impact to the public travelling through the McLeod River valley. CRC stated that while the plant was designed to maximize water recirculation, it would require a continuous and reliable source of make–up water. This CRC planned to obtain from a freshwater reservoir to be constructed at a site in Harris Creek.

CRC advised that it had considered dewatering of the fine refuse or tailings which would result from the coal cleaning process, but had found this to be both expensive and environmentally unnecessary. CRC therefore proposed, initially, to dispose of the tailings into a retention pond to be located in the Cheviot Creek valley. After approximately 5–7 years, when excavated pits became available, CRC intended to then utilize such pits to dispose of tailings. For reclamation purposes, consideration would eventually be given to either covering or capping the tailings with

waste rock or, alternatively, with water.

With respect to the coal cleaning requirements for the project, CRC stated it had considered two alternatives. These were: (1) construction of a new processing plant in the vicinity of the project; or (2) transporting the raw coal to the existing processing plant at the Luscar mine. CRC concluded that a new plant was preferred given that the continued use of the plant at Luscar would require additional transportation infrastructure, modifications to increase the plant's efficiency and capacity, and would result in a delay with respect to returning the land at the Luscar mine site back to the Province.

CRC stated that it had also considered three potential sites for a new coal preparation plant in the project area. These were: (1) the site of the former town of Mountain Park (which was rejected largely on social grounds); (2) a location in the McLeod River valley between Thornton and Cheviot Creeks (which was rejected because of air and water quality considerations; and (3) the Harris Creek location which, while not as favourable from an engineering perspective as the other sites, was considered preferable on both biophysical and social grounds.

CRC advised that it had also considered two potential sites for its proposed freshwater reservoir. These were sites at the Lower J Creek and the Lower Harris Creek. CRC observed that the Lower J Creek site would be a considerable distance from the plant site and that the reservoir would be located within an undisturbed area. On this basis CRC opted for the Lower Harris Creek location.

In considering a site for the fine refuse tailings pond, CRC advised that it had looked at five potential locations. Three of the sites — Lower Cheviot Creek, Upper Thornton Creek, and Upper Harris Creek — were considered as being capable of handling the required volume of tailings and further would not impact known coal reserves. Of these, CRC considered that the higher operating costs and the need for additional infrastructure effectively eliminated the Upper Harris Creek site from further consideration, while less favourable engineering factors eliminated the Upper Thornton Creek site. The Lower Cheviot Creek was selected as the preferred site.

2.3.2 Views of the Interveners

The Mountain Park Association had a number of concerns with CRC's proposed tailings handling and disposal program. In particular, they believed that CRC should be using dewatering of fine tailings rather than pond and/or pit disposal. In the view of the Mountain Park Association, CRC had demonstrated at the Luscar mine that such technology was technically feasible and since, in its view, dewatered tailings reduced environmental risks, CRC should be required to use this approach at the Cheviot Coal Project. The Mountain Park Association also questioned the capacity of the thickener proposed by CRC.

The AWA Coalition also took the position that the use of an impoundment to dispose of the fine tailings did not represent best available mining practices.

CEPA, while it did not oppose the concept of the proposed tailings pond, said that the related dam construction for the tailings and fresh water ponds was of concern to it and that the dams should continue to be viewed and designed as high hazard structures. This concern is addressed in Section 3.1 of this report.

Environment Canada recommended that the coal processing and loading facilities be located in a less environmentally sensitive location and further back from the McLeod River.

AEP advised the Panel that, with respect to the CRC proposal to cap tailings with water, if the project was to receive approval from the EUB, AEP would require further evaluations to demonstrate that the tailings ponds will meet the intended reclamation objectives and further documentation to confirm that the tailings will not cause adverse effects in the overlying capping water. AEP said it would also require contingency plans with respect to the two man–made lakes (i.e. Kennedy and Cheviot Lakes) where CRC planned to use the water capping technology, should further research confirm that this process was not feasible.

2.3.3 Views of the Panel

In considering the coal preparation plant, the Panel believes that there are several issues which must be addressed. These are whether a new coal processing plant is required, whether the site selected for both the plant and the associated ponds and reservoirs is appropriate, and whether the fine tailings control technology selected by CRC is appropriate.

With regard to whether a new plant is required, the Panel is prepared to accept the view of CRC that construction of the new plant will provide greater efficiency and reduce costs to the company. Since use of the existing Luscar plant would also require the transportation of raw coal through the Hamlet of Cadomin, which may result in a number of associated environmental issues, and also potentially delay reclamation of the Luscar mine site for a significant length of time, the Panel believes that construction of a new plant is reasonable.

With respect to the location of the various facilities required for coal processing, the Panel believes that CRC has made a reasonable effort to balance environmental, social, and engineering factors in its site selection process.

With regard to coal washing technology, particularly the use of fine tailings disposal versus dewatering of tailings, the Panel is prepared to accept CRC's proposal as technically acceptable. While alternative technologies are clearly available, the Panel is not convinced that they provide sufficient environmental benefits to require them to be adopted by CRC. The Panel's views on the environmental issues associated with water use, water quality, and the risks of accidental release of coal fine tailings from the tailings ponds are addressed in Section 3.2.

2.4 Proposed Transportation and Utilities System

2.4.1 Views of the Applicant

CRC indicated that a transportation corridor, which would provide road access, rail access, and an electrical power transmission line would be required to service the Cheviot Coal Project. Existing road access is limited to a gravel road (the Grave Flats Road) which is unsuited to the traffic needs of the Cheviot Coal Project. Existing railway and power line facilities currently only extend to the Hamlet of Cadomin, approximately 12 km from the proposed site of the coal processing plant.

CRC advised of its preference to locate the transportation corridor within the McLeod River valley. It proposed that the existing derelict railway lines would be replaced on the existing right of way between Cadomin and Mountain Park. It also proposed that the existing Grave Flats Road would be upgraded from its junction with Highway 40 to the location of the proposed coal preparation plant at Mountain Park. The upgrading included, following discussions with the residents of Cadomin, a commitment by CRC to create a bypass around Cadomin.

In addressing alternatives with respect to a transportation corridor into the Cheviot Coal Project, CRC advised that it had also considered the MacKenzie Creek and the Cardinal River corridors in addition to the McLeod River corridor. The main criteria considered were: (1) convenient workforce and supplies access to and from Hinton; (2) access to the existing railway infrastructure; (3) access to existing electrical power sources, and (4) avoiding increased public access and resulting impacts. Of the three options considered, CRC concluded that the McLeod River corridor represented the most acceptable route.

Within the McLeod River corridor, CRC noted that it had initially considered three route options for the upgraded road. These included: (1) upgrading the existing road which would continue to be routed through Cadomin (Option A); (2) creating a bypass road to be located on the west terrace above the community and connecting with existing road north and south of the community (Option B); and (3) a new route through the Luscar mine site from Highway 40 and connecting with the Grave Flats Road south of Cadomin (Option C). CRC advised that, as a result of consultation with the public, it had eliminated Option A since it was unacceptable to the residents of Cadomin. CRC also advised that Option C presented logistical and safety concerns for the company. More detailed plans were then developed for Option B. CRC noted that this option resulted in considerable local concerns with the initial proposed routing and, following further consultation and consideration of variations to Option B (the bypass proposal) eventually developed a route (Appendix C) which was acceptable to the community.

TransAlta noted that it had applied for approval of a 138 kV transmission line needed to provide electrical power to the mine site to be located within, where possible, the proposed right of way of either the upgraded Grave Flats Road or the railway line (Figure 4). TransAlta felt that inclusion of the transmission line within an existing right of way would minimize land requirements and would reduce the overall impacts of the transmission line. TransAlta also advised it would work with the residents of Cadomin should any electrical interference arise from the power lines.

TransAlta indicated that it had considered a number of routes for the transmission line prior to selecting the proposed route. These included: (1) routes through the MacKenzie and Little MacKenzie Creeks; (2) a route located to the east of Cadomin; (3) a route located to the west of Cadomin; and (4) a route which would pass through the existing Luscar mine. TransAlta noted that higher costs, and the opportunity for increased access into the relatively undisturbed MacKenzie and Little MacKenzie Creeks, made Option 1 both economically and environmentally unacceptable. Increased length (and therefore cost) and interference with current mining activities caused TransAlta to eliminate the Luscar mine route (Option 4). While the route east of Cadomin (Option 2) was considered a reasonable option, it was eventually rejected because it would also open up new access and would not take advantage of the proposed road bypass around Cadomin. TransAlta, following consultation with the public, identified the Cadomin west bypass route (Option 3) as the preferred route.

CNR indicated that it intended to follow, to a large extent, the existing railway right of way for the Cheviot Coal Project rail line. Restoration work would include rebuilding the rail bed, replacing one bridge on the McLeod River, installing new trackage, and constructing a rail loop for the coal loadout facilities. Two bridges used in the original right of way would be avoided by returning the McLeod River to its former channel. Crossings at Prospect Creek, Cheviot Creek, Thornton Creek, and two McLeod River crossings would be accomplished using culverts. CNR, on behalf of CRC, advised that it had considered five alternatives with respect to the location of the railway loadout loop. Only one of these alternatives (Option 5D) fully satisfied all of the operational requirements related to the Harris Creek site for the coal preparation plant.

CRC stated that it intended to temporarily house construction workers in two camp sites located at the south boundary of Cadomin and at the Mountain Park area, but in view of concerns expressed by CEPA, it was now looking at the possibility of replacing the Cadomin site with temporary accommodation in Hinton. No decision had, however, been made, and CRC wished to keep its options open in this regard.

2.4.2 Views of the Interveners

No interveners to the hearing questioned CRC's need for an upgraded road, and a new rail line and power line or argued that CRC should consider other alternatives to the proposed transportation and utilities corridor. Residents of the Hamlet of Cadomin, through CEPA, expressed general acceptance of the proposed road bypass and of the proposed route of the transmission line past the Hamlet, but indicated that there remained some outstanding issues related to noise and dust from the bypass road. With respect to the proposed construction camp at Cadomin, CEPA expressed strong concerns that its proximity to the Hamlet could result in increased rowdiness or crime and so reduce area quality of life. These issues are addressed in Sections 5 and 7, respectively, of this report.

The AWA Coalition was also concerned that the construction camp at Cadomin could impact the Cadomin Caves due to an increase in visits to the Caves, particularly during periods when the bat populations using the Caves were particularly sensitive to disturbance. This issue is addressed in Section 4.5.

2.4.3 Views of the Panel

Provided the environmental and social issues can be addressed, the Panel accepts that CRC has established the need for the proposed transportation and utilities corridor. The Panel also believes that CRC has adequately evaluated the available alternatives for accessing the proposed mine site and that the McLeod River corridor represents a reasonable balance between economic, social, and environmental costs. In particular, the use and upgrading of an existing railroad right of way and road system; the reduction in impacts on the Hamlet of Cadomin through use of a bypass; and the avoidance of creating new access in currently undisturbed valleys are considered by the Panel to be appropriate. The Panel also accepts CRC's and TransAlta's Cadomin west bypass routing of the proposed access road and transmission line as reasonable.

3 AQUATIC ENVIRONMENTAL EFFECTS

The Cheviot Coal Project has the potential to affect both groundwater and surface water discharge patterns (i.e. water quantity), the physical and chemical nature of subsurface and surface waters (i.e. water quality), and the organisms which depend on both water quantity and quality (i.e. aquatic habitats and fisheries). Each issue is treated separately below.

3.1 Water Quantity

3.1.1 Views of the Applicant

Study Area

The areas considered by the applicant with regard to effects on groundwater and surface water quantities differed slightly. With regard to groundwater, CRC stated that it had considered effects within the proposed mine permit boundary, as well as at those locations beyond the permit boundary where concerns were raised during the public consultation process. These areas included the Hamlet of Cadomin, Alexis First Nations land, the Smallboy Camp, Cadomin Caves, Cadomin Springs, Miette Hot Springs, and the Town of Edson. Surface water flows were assessed for both the McLeod River and Cardinal River drainages. Both the immediate effects on surface flow within the project boundaries, as well as downstream effects, were considered.

Existing Conditions

Existing groundwater conditions were established based on sampling results over two years from 27 piezometers and two water wells placed within the mine permit area. These provided data on depth to groundwater, information on flow rates and, to a lesser degree, on the direction of groundwater flows. Surface water flows were measured by CRC at six locations within or proximal to the coal lease and additional historic data were taken from Water Survey of Canada (WSC) gauging stations further downstream. The latter provided an estimate of longer-term, regional flow patterns.

The existing primary groundwater bearing units identified within the mine permit boundary were sandstone bedrock, any other fractured bedrock, and quaternary gravel deposits. The two bedrock zones were noted to have highly variable flow rates (hydraulic conductivities of 1.4×10^{-8} to 1.0×10^{-5} metres per second) but were felt to be comparable to the formations and associated flow rates found at the Luscar mine. Depth to groundwater was found to vary from 0 to 65 m below ground level, and a number of flowing springs and drill holes in the lower valley areas suggested that the bedrock formations provided areas of groundwater discharge. The quaternary gravel deposits, on the other hand, were found generally within the valley bottoms, and acted as areas of groundwater recharge, with high hydraulic conductivity and the potential to store and transmit large volumes of groundwater.

In describing the existing surface water flows, CRC noted that several tributaries to the upper McLeod River would be disturbed. These included Prospect, Powerhouse, Cheviot, Thornton, Harris, and MacKenzie Creeks. Red Cap Creek, a relatively small tributary to the Cardinal River, would also eventually be affected by mine development.

CRC noted that some disturbance of these drainages has already occurred or is occurring. Sources of disturbance included the Grave Flats Road, the existing CN rail line, old coal refuse piles scattered along the valley bottoms, and the presence of abandoned underground and surface mining activity, particularly the open end pit and associated rock dump on Cheviot Creek. As well, more recent disturbance has included coal exploration by CRC and the creation of trails by off–highway vehicles throughout the general area. Disturbance levels in the Cardinal drainage were felt to be somewhat less than in the McLeod River drainage area.

A number of both natural and manmade features were felt to affect existing surface water flow patterns. CRC noted that Prospect Creek exhibited very high runoff rates due to its high gradients, while a high degree of flow attenuation was noted at Cheviot, Thornton, and MacKenzie Creeks due to the presence of the existing abandoned surface pit, groundwater discharge from an abandoned underground mine, and a large wetland complex, respectively.

Expected Effects

The risk of impacts from the development of the rail line, power line, and access road on groundwater flows were predicted to occur primarily in those locations where shallow water supply wells were located in areas proximal to the construction activities. CRC proposed to provide alternative water supplies should disruption occur. No impact on Cadomin Spring was predicted. Negligible impacts on surface water flows were predicted from either rail or road construction.

With regard to the coal processing plant, CRC predicted insignificant changes to groundwater recharge and discharge rates would occur as a result of grading activities during construction. Significant changes to surface flows were predicted, however, from the operation of the coal processing plant. These would occur because water demand for the coal processing plant would require approximately 20 per cent of the average summer flows of Harris Creek, the proposed water supply source, and demand would exceed the average winter flows. As a result, a water storage reservoir was required on Harris Creek which would be used to store sufficient summer flow volumes to meet the plant's water requirements on an annual basis. CRC stated that it was unable to mitigate these impacts and deemed them to be significant.

With regard to surface mine impacts on groundwater, CRC noted that all phases of mine development (e.g. land clearing, top soil stripping, overburden removal, coal removal, backfilling of pits, and the diversion of surface water courses) will have an affect on groundwater flows. In particular, mine pit development will alter recharge patterns and, since the pits will extend below the existing water table, will alter groundwater flow patterns as well. During the initial phases of mining, CRC noted that it will be necessary to remove groundwater from pits. This was predicted to create a zone of groundwater drawdown extending as far as 1000 m from the pits, depending on pit size. With backfilling of the pits following mining and the creation of external waste rock dumps, some localized changes in groundwater discharge and recharge were also predicted. These are expected to stabilize relatively quickly and, based on observations at the Luscar mine, were not felt to be significant.

CRC stated that some local springs which are likely used by wildlife will be lost as a result of mine development, as will a water well currently supplying the Mountain Park Staging Area. With regard to the former, CRC assumed that other seepage sources and the in-pit lakes would

eventually replace these resources. With respect to the well, CRC indicated that it was prepared to consider replacing this well during the reclamation phase, dependent on the results of public consultation at that time. CRC noted that it expected little or no impact on groundwater on the Alexis First Nations lands and no impact on the Hamlet of Cadomin, the Cadomin Caves, Cadomin Springs, Smallboy Camp, Miette Hot Springs, or the Town of Edson.

Those features of the surface mine that will effect groundwater flows will also impact surface flows. CRC noted that the careful handling of surface flows during mining was a key component of their existing Luscar mine and this would also be the case at the Cheviot Coal Project. Over the course of the 20 year mine development, CRC stated that all surface drainages within the coal lease boundary would be affected to some degree (Figure 5). During active mining, streams would be diverted around the open pits and so little or no alteration in flows from this activity was predicted. However, dewatering of the open pits would increase surface flows above normal levels, with a proportionately much greater increase during the winter months. CRC saw these changes as relatively short term and not significant, given the natural variability in the local stream flows.

In addition to stream diversion, CRC proposed to use existing valley bottoms in a number of cases as areas for the dumping of waste rock, and so permanently bury the stream channel. In order to ensure that stream flow could continue at grade through these valleys, CRC planned to construct rock drains. These drains are created by preferentially spilling waste material so that the very large diameter rocks are placed at the base of the waste dump. CRC noted that, given the large interstitial spaces between these rocks, practice has demonstrated that such drains are capable of passing very large flows of water, with little impact on downstream flow rate or water quality.

Following mining, CRC proposed to return at least some surface flows back into their original drainages, although, as noted above, they would now likely flow through end pit lakes and/or rock drains (Figure 5). In other cases, there would likely be complete diversion from some parts of the original drainage (e.g. Cheviot and Thornton Creeks) and into others (e.g. portions of the Upper McLeod River). CRC noted that, while the presence of end pits in the drainages will tend to increase surface flows during the active mining phase, once reclamation is initiated and surface water is allowed to re-enter the end pits (and the other backfilled pits as well since they have a relatively high degree of voidage), there will be a general decline in surface flows. The filling of the end pit lakes is predicted by CRC to require from several months to three years, and during that period general flow reductions of 12 per cent to 20 per cent of the summer flows of streams within the mine project boundaries, and flow reductions of 1 per cent in the Cardinal River, 4 per cent in the McLeod River at Cadomin, and 4 per cent in the lower reaches of MacKenzie Creek are predicted. In general, CRC viewed these reductions as within the normal range of flow variation for the streams in question and did not consider these impacts as significant. Some mitigation of these effects would also be achieved through the recycling of water at the plant to minimize use and the use of water from the tailing ponds when possible. Once the end pit lakes were filled, CRC predicted that these would result in a degree of flow stabilization in the affected drainages.

Risk of Accidents

Two potential sources of accidental increase in surface flows were considered by CRC. This would occur if there were either a failure in the Harris Creek freshwater impoundment or the Cheviot Creek tailings pond. In the case of a complete failure of the Cheviot Creek tailings pond, CRC concluded that impacts would be limited to some flood damage to mine infrastructure such as the railway loop and to the Graves Flat Road immediately downstream of the pond. If the Harris Creek reservoir were to fail, CRC anticipated somewhat higher levels of damage to the mine infrastructure and to the access road. Furthermore, some risk to random and organized campers was predicted, while it was calculated that the Hamlet of Cadomin would experience a flood event roughly equivalent to a 1:100 year flood.

In order to reduce the risk of an uncontrolled flow from the Harris Creek reservoir, CRC agreed in discussions with CEPA to use Probable Maximum Flood as the design criteria for this dam. For the Cheviot tailings dam, a 1:20 year flood design was used. However, CRC intended to ensure that the pond could contain the 1:20 year flood at all times. Therefore, as the pond filled, the dam would normally be maintained at levels able to withstand much higher levels than the 1:20 year storm event. Furthermore, CRC planned to divert most of the flow upstream of the tailings pond outside of the Cheviot drainage, which would reduce the size of the 1:20 year flood substantially. Furthermore, in an agreement reached with the Hamlet of Cadomin, CRC agreed to monitor the integrity of the dams in such a way as to be able to warn the residents regarding an impending dam breach. CRC also agreed, should the dam fail, to accept full responsibility for any damages and to provide whatever assistance to Cadomin as necessary to deal with the impacts of flooding. CRC advised that it was prepared to construct potential flow channels at the surface of rock drains in order to pass, without unacceptable erosion, any surface flows arising due to a failure of the drain to function properly.

Cumulative Effects

Because the effects on groundwater flows would not extend regionally, CRC did not believe that any cumulative effects on groundwater flows due to the project would occur. Some regional effects on surface flows would occur during pit dewatering and subsequent re-filling and due to water use in the coal processing plant but CRC also felt that, given the size of these effects relative to the normal variation in flow rates, no cumulative effects would arise. The other notable source of potential effects on surface water flows noted by CRC was logging in the region. However, data collected in the Tri-Creeks Study led CRC to conclude that the effects on surface flows from forestry operations would also be small.

Monitoring

CRC proposed to monitor groundwater levels in all piezometers semi-annually until the start of mining and continue semi-annual monitoring in piezometers beyond the potential effects of pit construction. Monthly sampling in piezometers located closest to the new pits was recommended, with sampling frequency to be reviewed once a sufficient data base had been collected. No specific surface water monitoring program was recommended.

3.1.2 Views of the Interveners

Two concerns were raised by CEPA with regard to changes in regional water quantity. First, CEPA was concerned with the potential impact of surface mine development on the flow rates of groundwater within the Hamlet. This issue was of particular concern since the Hamlet of Cadomin relies on groundwater for its water supply. The second issue of particular concern was the possible impacts of failure of either the Cheviot tailings pond dam or the Harris Creek freshwater dam on the community. CEPA believed that: both dams must be designed to "high hazard" standards; that the Harris Creek dam breach analysis should be re-evaluated once construction of features such as downstream bridges and bank armouring have been completed; that the elevations used in the flood plain analysis be field verified; that the height of the Harris Creek dam be minimized to the extent practical; and that a risk assessment be done to confirm which of the two dams poses the greatest threat to the community.

In its final argument, the RMEC suggested that, in its view, both the groundwater and surface water hydrology reports were sufficiently flawed so as to be unreliable for predictions regarding the impacts of the proposed project.

3.1.3 Views of the Panel

In general, the Panel is of the view that CRC appears to have a good understanding of existing surface flow conditions within the proposed development areas. The company's knowledge of groundwater flow patterns, given the difficulty inherent in measuring these, is understandably less extensive, but given CRC's experience at the Luscar mine, also appears to be sufficient to predict the impacts of development on groundwater flows.

The Panel accepts CRC's contention that the impacts of the road and rail corridor on surface flows will, with good engineering practice, be negligible. The Panel also accepts CRC's undertaking to replace groundwater supplies within the Hamlet of Cadomin, should these be damaged, as reasonable mitigation of those impacts. The Panel will expect CRC to ensure that it has measured existing flow rates within the community prior to development in order to avoid conflicts.

The Panel notes that CRC's operations will significantly alter surface flow patterns and rates in Harris Creek over the life of the mine (i.e. 20+ years). While these flows will eventually be re-established, there will be a short term loss of aquatic and wildlife habitat in Harris Creek (see Sections 3.3 and 4.1). Given that the flow patterns in the McLeod River below the Harris Creek confluence will be relatively unaffected, the Panel is of the view that this environmental effect is not significant.

With regard to the levels of groundwater disturbance due to mining activities, the Panel accepts that these will be substantive within the mine permit boundary. However, the Panel also believes that CRC's contention that groundwater flow effects are unlikely to extend more than 1000 m beyond the areas of active mining is reasonable and so will not be significant in areas beyond the mine permit. The Panel also believes that groundwater flows will become re-established with the end of mining activities, although the flow patterns will undoubtedly be very different. The Panel also notes CRC's commitment to replace the water well at the Mountain Park Staging Area if required following further public consultation.

The Panel believes that the alteration of existing surface flows during the active mining phase is the potentially greatest source of adverse effects both within and beyond the mine development area. In particular, the Panel believes that CRC may have underestimated the effects of removal of vegetation and other sources of flow attenuation (retention) on surface discharge rates, particularly during storm events. However, the Panel also accepts that ultimately CRC will need to manage these events in order to carry out its mining operations and continue to meet water quality objectives (see Section 3.2) and so will need to include the necessary water management features into its engineering design.

The Panel is prepared to accept that the small surface flow increases due to pit dewatering will not result in any adverse downstream effects. The Panel is also prepared to accept that filling of the end pit lakes can be carried out in a manner which will not negatively affect downstream flows. However, CRC will be required to monitor area flow rates and take whatever steps are necessary to maintain minimum flows, particularly during the winter months. It is strongly recommended that CRC work with AEP prior to initiating significant mining activities to establish these flow levels. Once reclamation is complete, the Panel believes that the presence of the end pit lakes will at worst have a neutral effect and may in fact represent a net benefit to downstream flows, again particularly during the winter, by attenuating the naturally high spring runoff events. While some changes in particle size range due to sediment deposition in the end pit lakes in stream substrates below the mine site may occur as a result, this impact, given the regional topography, is not expected by the Panel to be significant.

The Panel is prepared to accept that the rock drain technology being proposed by CRC is capable of effectively passing a range of flows and is a well understood approach. The Panel does note, however, that the use of rock drains at the Cheviot mine is much more extensive than that at the Luscar mine, and so the Panel will expect CRC to be prepared to consider alternative approaches if monitoring at the first rock drains constructed fail to meet expectations. Those rock drains where the upstream face of the waste dump is relatively low (and therefore the risks of overtopping the drain may be higher) are of particular concern, since this could result in significant, long term erosion. Should the Cheviot Coal Project receive approval, the Panel will require that CRC continue to re-evaluate the need for individual rock drains and determine if there are reasonable opportunities to carry those flows on the surface of the waste dump, or preferably avoid rock spillage within the drainage altogether.

The Panel notes the concerns raised by CEPA regarding the possible impacts of the failure of either the Cheviot or Harris dams on Cadomin. The Panel believes that the use by CRC of Probable Maximum Flood as the design standard for the Harris Creek dam and a 1:20 year flood design for the Cheviot dam (given its greatly reduced catchment), is adequate to deal with the concerns of the Hamlet. The Panel also notes that CRC has committed to providing compensation to the residents should damage from flooding occur as a result of failure of either structure, and to providing a warning system should a failure occur. The Panel also notes that further approvals for the dams will be required from AEP. In the Panel's view, CRC has undertaken all reasonable steps to avoid and/or mitigate the impacts of accidents in this case. The Panel is not prepared to require CRC to undertake further work to assess downstream risks beyond that already committed to, but does encourage CRC and CEPA to continue to work together to resolve their issues.

With regard to cumulative effects, the Panel does not believe that significant risks to regional flow rates would be created by the development of the Cheviot Coal Project. That said, regional monitoring of flow patterns by CRC, other appropriate companies, and regulatory authorities should continue.

With regard to monitoring programs, the Panel accepts CRC's proposed monitoring program for groundwater quantity as generally adequate. With regard to surface flows, the Panel believes that a formal program, particularly with regard to winter flow rates, is needed, if only to establish required minimum flows. CRC should work with AEP and DFO, as appropriate, to establish this program in conjunction with its monitoring programs for surface water quality and aquatic habitat (see Sections 3.2 and 3.3).

3.2 Water Quality

3.2.1 Views of the Applicant

Study Area

Groundwater samples were collected from several points within the mine permit boundary, including from the Harris Creek and Cheviot–Thornton Creek aquifers, from discharge from an underground mine (the Thornton Creek mine portal,) and from several area springs. Samples were analyzed for routine potability, major ions, and dissolved metals. Bioassays (96 hr rainbow trout) on some samples were also conducted.

Data on sediment levels in surface waters were collected at stations used to monitor surface flows in the mine permit area. Regional sediment data were obtained from the Tri-Creeks watersheds near Hinton. The potential long term effects of mine development on water quality were assessed through measurements of benthic invertebrate populations (18 sites on eight streams), epilithic algae communities (16 sites on seven streams), and bioconcentratable substances using semi-permeable membrane devises (SPMDs). Existing water chemistry was measured at 35 sites on the McLeod River system and six sites on the Cardinal River system. Sample stations were located both within and downstream of the proposed mine site and included the effects of discharges from the two existing coal mines, the Gregg River mine, and the Luscar mine into the McLeod River.

Existing Conditions

In assessing existing groundwater conditions, CRC noted that relatively high levels of sulphur, barium, and strontium were observed in groundwater samples from a number of sites, but these values were also highly variable between sample sites. The groundwater samples were considered to be non-toxic based on the results of the trout bioassays.

In general, current sediment levels in surface waters were proportional to flows but varied significantly between drainages. For example, maximum values recorded in Prospect Creek exceeded 1000 ppm while maximum concentrations in MacKenzie Creek and the Cardinal River were less than 50 ppm. When compared to regional streams, sediment loads in the mine permit area were considered to be high, due in part to the presence of relatively steep terrain.

The benthic invertebrate communities varied somewhat with flow rates but generally were characteristic of communities occurring in fast flowing water. The algal communities were generally at or slightly above the historic ranges found in the region. Bioassay data from the Luscar mine for the outflow from the Luscar Creek settling pond and for the coal processing plant outflow showed no acute toxicity. Marginal toxicity from tailings leachate was observed but this result could not be repeated. Acute toxicity, as measured using Microtox, was observed from the materials concentrated in the SPMDs but this result was believed to be a sampling artifact.

In assessing existing surface water chemistry, CRC divided the McLeod drainage basin into three reaches. The first reach extended from the proposed mine site to above the confluence with Luscar Creek which drains from the Luscar mine. Water in this reach is influenced primarily by inflow from a number of tributaries, and groundwater flow from the old underground mine (Thornton Creek) and by Cadomin Springs. Flow from the old mine workings resulted in a localized increase in sodium, barium, potassium, and strontium loadings, but these declined to background below the confluence with Prospect Creek. High sulphur loadings from the Cadomin Springs and from Whitehorse Creek were also observed by CRC.

The second reach extended from the confluence with Luscar Creek to the WSC Station. In this reach, CRC noted that there was a measurable increase in sodium, chloride, total inorganic carbon, and nitrates due to the influence of the Luscar mine. However, all parameters remained within the existing freshwater guidelines and objectives.

Within the third reach, which extended from the WSC Station to upstream of Edson, CRC observed that some parameters influenced by the Luscar Creek discharges decreased or stabilized. However, others increased due to the influence of additional loadings from the Mary Gregg Creek and the Gregg River. Both are heavily influenced by upstream mining activities, both the Luscar mine and the Gregg River mine. Increasing and/or fluctuating levels of organic carbon, iron, silica, TSS, nitrates, and sodium were all attributed to runoff from mining areas.

Within the three reaches on the McLeod River a number of the surface water quality criteria and guidelines were exceeded over the two–year sampling period. These exceedances were attributed by CRC to natural factors. CRC also noted that these values were consistent with historical data collected for the region. A similar pattern was observed on the Cardinal River, where the freshwater objectives for aluminum, copper, iron, phenolics, and dissolved oxygen were exceeded in some samples.

Expected Effects

Construction and operation of the road, rail line, or powerline were predicted by CRC not to have any direct impacts on groundwater quality. The primary source of impacts to surface water quality from the construction and operation of the utility corridor would be sedimentation resulting from construction in or near the McLeod River and other water courses. In general, however, CRC viewed these impacts as insignificant relative to natural levels of sediment loading. Mitigation of the effects of sediment loadings could be achieved through careful construction techniques (e.g. diversions) and timing. Some risk of the runoff of calcium chloride used for de-icing and dust suppression on the access road was noted but the effects were again felt to be insignificant.

Operation of the coal processing plant will produce a refuse (tailings) which will be discharged to the tailings pond. Under normal operations, no tailings effluent will be released and so no impacts will occur. Other sources of potential contaminants include plant discharge (slurry) water, surface runoff from the plant and coal stockpile area, and sewage. Surface runoff would be diverted to settling ponds, treated with surfactants, and released, while sewage would be directed to a sewage treatment plant.

CRC stated that there was little risk to groundwater quality from the coal processing plant due to recharge from either the tailings pond or from other sources of contaminants. With regard to surface water quality, CRC noted that there were risks of increased sedimentation during the construction phases for the coal processing plant, but because these could be prevented through careful construction techniques, the effects would be insignificant.

CRC indicated that they did not predict any impacts on local or regional groundwater quality from mining operations. The one exception to this was a possible chance of elevated nitrate levels due to blasting residue leached from the overburden. In general, groundwater quality was predicted to not change substantively from current conditions.

A number of the components of mine development were examined by CRC in order to determine their potential effects on surface water quality. The active dewatering of pits and the old underground workings were expected to have some effects due to higher than background levels of a number of compounds (e.g. several metals, salts, and nutrients) in the existing groundwater. These impacts were expected to be localized due to downstream dilution and would only last for a few years, primarily during the mining of the Cheviot Creek area.

During the operation phase of the mine, the risk of sedimentation could best be assessed, in CRC's view, by considering the low sediment release rates from the existing sediment ponds at the Luscar mine. Sediment data over a five–year period from the existing sediment ponds at the Luscar mine indicated a maximum level of 200 parts per million (ppm) and generally less than 50 ppm during periods of moderate to high runoff. CRC noted that these loadings were less than the natural loadings recorded in the Tri-Creek watersheds. Coal slurry water from the Luscar mine was assessed for toxicity and no acute lethality was found, although relatively high levels of sodium, nitrogen, and occasionally high levels of suspended solids and organic carbon were observed.

CRC noted that settling pond discharges were, however, a second major potential source of surface water quality contaminants . All runoff and pit water would be directed to settling ponds for treatment prior to release. Settling pond discharges may on occasion have higher than background levels of a number of compounds, including metals and nutrients, and data taken by CRC from Luscar Creek suggest that the Luscar mine is having measurable impacts downstream.

While most water quality impacts associated with discharges from the proposed mine were predicted by CRC to be localized, nutrient loading and the associated risk of eutrophication was considered to potentially have regional effects, possibly as far downstream as Edson. CRC noted that it had undertaken a number of programs at the Luscar mine to reduce the amount of residue remaining from blasting operations and therefore the levels of nitrogen available to enter the watershed. CRC advised the Panel that it would continue with these practices at the Cheviot

mine. During cross examination, CRC also agreed that levels of some metals in the Luscar mine settling pond discharges (e.g. selenium) were above water quality objectives and that further work was needed to ensure that these would not be an issue in the Cheviot Coal Project.

Accidents

CRC noted that there was some risk to both groundwater and surface water quality from accidental release (spills) of compounds. These risks would occur during both the construction phase and the operation phase and could occur within the utility/transportation corridor, the coal processing plant, or within the mine. CRC felt that the primary sources of spills would be: (1) the loss of fuels either from storage during construction and operations or during transportation from transport trucks during operations; (2) the loss of bulk chemicals (e.g. magnetite) during transportation by either rail or truck; and (3) the loss of coal during transportation by rail. While a major spill of either fuel or chemicals into a water course could have significant effects, CRC believed that it had in place adequate emergency measures to ensure that the risk was very small and the likelihood of impacts was not significant.

CRC stated that the accidental release of slurry and/or tailings from the coal processing plant and the tailings pond also has some potential to affect water quality. CRC noted, however, that its chemical analysis of tailings indicated no substantive difference from the Luscar mine settling pond water quality which is routinely discharged to the environment, and that bioassays on concentrated tailings water and on coal slurry water also showed no toxicity. CRC also noted that a number of design features (e.g. incorporation of plant slurry lines within other lines in at–risk locations) had been used to further reduce the risk of accidental release of tailings. Finally, CRC observed that the fine tailings impoundment would only be in operation for five to seven years. As a result, the effects of an accidental release were judged to be insignificant.

Cumulative Effects

CRC noted that there were a number of sources of sediments into the McLeod River and, to a lesser extent, the Cardinal River drainage and that the mine was also a potential source. However, CRC observed that the establishment of end pit lakes would in fact reduce existing sediment loads and, based on data from the Tri-Creeks watershed study, cumulative sediment loadings from sources such as logging were not expected. CRC noted that the upper reaches of the Cardinal River drainage were largely undisturbed and so foresaw no cumulative effects from its proposed operations.

With regard to the McLeod River, CRC observed that water quality was already impacted by timber harvesting, mining and quarrying, exploration for natural gas, recreation, and human use (e.g. at Cadomin). CRC did not predict any cumulative effects on groundwater quality as a result of its proposed new mine development. However, some cumulative effects on surface water quality due to sedimentation and eutrophication were considered to be possible. To some degree, the closure of the Luscar mine shortly after the opening of the Cheviot mine was expected to help to reduce any cumulative effects. CRC noted some difficulty in obtaining cumulative effects information (e.g. forestry) to enable a thorough analysis.

Monitoring and Follow Up

CRC did not propose any specific monitoring programs for water quality in its application but did indicate that routine monitoring of settling ponds and monitoring of benthic organisms and epithilic algae would be recommended. CRC indicated as well that monitoring of discharges of underground mine water, treated sewage, and tailings would be appropriate and that any monitoring program would be carried out in a manner that ensures that the data collected are compatible with regional water quality programs.

A somewhat more specific monitoring program was also set out in CRC's Cheviot Project Water Policy for the Hamlet of Cadomin (Appendix D). The policy includes a commitment to ensure that a water monitoring program is in place at least one year before active mining commences, with baseline data on both surface and groundwater quality, including samples from within and around Cadomin, and ongoing semi-annual sampling from surface sites and both observation and domestic wells.

3.2.2 Views of the Interveners

In its submission, CEPA noted that it was concerned with protecting water quality and particularly groundwater quality since many of its members depended on groundwater sources for their water supply. At the hearing, CEPA requested that the water policy agreed to by CRC and CEPA be made a condition of any approval for the project.

At the hearing, the Mountain Park Association indicated it had strong concerns regarding the use of reservoirs for the storage of tailings. In particular, they were concerned with the possible water quality impacts from failure of the tailings pond dam and the subsequent release of tailings into the downstream watersheds. They indicated a strong preference for mechanical dewatering of tails, water recycle, and the direct disposal of the tails into pits rather than into a tailings pond. The Mountain Park Association did not believe that, given the relatively small volume of tails when compared to waste rock, this would be an unacceptable cost to CRC.

The Smallboy Camp indicated that their concerns regarding water quality were particularly focused on the potential impacts to Red Cap Creek and therefore on the Cardinal River system. However, they also noted that the Cheviot Coal Project was located on a significant divide in the watershed and so believed the mine could have potentially very far reaching effects into several watersheds. At the hearing, the Smallboy Camp reiterated an earlier request to CRC that it consider only mining the western two–thirds of its lease and limiting its development activities to only the McLeod River watershed.

The AWA Coalition identified a number of concerns regarding water quality resulting from the Cheviot Coal Project. One was the possibility that chemicals, including diesel fuel, would migrate from the coal processing plant into the tailings pond, resulting in emissions to the environment. A second concern was that mining operations would result in unacceptably high levels of metals, nitrates, and pollutants being discharged to area streams. In particular, the AWA Coalition noted that nitrates arising from blasting could result in downstream eutrophication and, if converted to nitrites, could present a potential health hazard. The AWA Coalition noted that CRC had not committed to a waste water treatment system to deal with either nutrient levels or with domestic sewage.

The AWA Coalition also noted that there was little evidence adduced regarding the possibility of high levels of sedimentation if a heavy rainfall occurred prior to the establishment of vegetative cover within the mine site. They observed that CRC had had five or six exceedances per year of its licence limits for sediment discharges at the existing Luscar mine. In the view of the AWA Coalition, CRC had not adequately addressed either the likely sources of sediment from the Cheviot mine or methods to curtail sediments. The AWA Coalition also raised concerns that other compounds, such as selenium, are being discharged from the Luscar mine at levels above the current guidelines and water quality objectives. They also noted that the anoxic conditions likely to develop at the bottom of the proposed end pit lakes could exacerbate this problem by creating conditions suitable for the creation of more toxic forms of these compounds. Furthermore, they believed that CRC's data confirmed that mining activities at Mountain Park continued to contribute contaminants to area waters long after mining had ended.

The RMEC also raised a number of concerns regarding surface water quality. They noted that, in their view, CRC had not adequately addressed the potential risks of acid mine drainage or the potential associated loading of metals. CRC had also not addressed the potential effects of rock dump failures on water quality, particularly the sedimentation effects of such a failure. The RMEC also believed that CRC had greatly underestimated the downstream impacts of its development on area water quality. In particular, they predicted that there were significant risks of chronic sediment loadings, eutrophication from nutrients, and toxicity from metals and other compounds released into the area receiving streams as a result of mining activities. In general, the views of the RMEC were also echoed by the Western Canada Wilderness Committee (WCWC).

AEP stated that its policy was to not allow releases or discharges into the environment that could result in adverse environmental impacts. AEP noted that some metal levels in discharges from the mine were predicted by CRC to exceed current guidelines. AEP indicated that it believed that CRC should undertake control efforts for these metals, as well as carry out further research into the likely extent of such exceedances, as well as the relevance of the guidelines to the existing environment at the Cheviot Coal Project.

AEP commented on potential nutrient loadings from the Cheviot Coal Project and noted that while eventually the Luscar mine loadings would decline, for a least some period of time there would be nutrient discharges from both projects. As a result, AEP believed that CRC would need to consider active control of nutrient loadings into the McLeod River watershed if current levels were to be maintained. AEP also noted concerns regarding the effect of the coal tailings on overlying water quality and recommended that monitoring of this would be needed. AEP was also concerned with possible water temperature elevation downstream from the mine site. Trout Unlimited proposed that continuous water quality monitoring could be achieved through the use of caged rainbow trout or some other similar approach. This would assist CRC in dealing with the effects of excess levels of flocculant and accidental spills and releases on the mine site. Trout Unlimited also recommended ongoing monitoring of siltation levels, particularly in regions where upstream construction of end pit lakes and rock drains had reduced the natural flushing capacity of the streams. Both Trout Unlimited and the Alberta Fish and Game Association also suggested that monitoring of nutrients downstream was necessary, in part to address the risks of reduced oxygen levels due to eutrophication and the associated potential for fish kills.

3.2.3 Views of the Panel

The Panel believes that CRC's programs to measure existing groundwater and surface water quality provide sufficient information to assess the potential environmental effects of the Cheviot Coal Project. In general, the Panel is of the view that existing water quality within the areas to be affected by the project is good. The Panel notes, however, that some changes to the water quality of the upper reaches of the McLeod River and its tributaries continues to occur due to past mining activities. At the same time, operations at the existing Luscar and Gregg River mines are having measurable effects on water quality downstream of the proposed project. Furthermore, some exceedances of provincial and/or national water quality objectives are also already occurring due to both anthropogenic and natural causes. As a result, predicting the future environmental effects of new development is somewhat confounded.

Neither construction nor routine operation of the road, rail line, or powerline appear likely to have significant adverse effects on either groundwater or surface water quality. Furthermore, these risks of impact likely can be readily reduced through prudent practices such as runoff control.

Risks to water quality from construction of the coal processing plant also appear to be small, assuming normal construction practices are followed. The Panel also notes that CRC intends to operate the fine tailings pond as a closed loop and so avoid any direct discharge to the environment. There is presumably risk of water from the tailings pond entering the groundwater, but the evidence provided by CRC at the hearing suggests that this material is relatively benign and so any associated environmental effect would not be significant. The Panel does not believe that diesel fuel carryover into the tailings pond will be a significant issue.

The surface mine operations, in the Panel's view, clearly do represent some risk of impacts on both local and regional water quality. At least some nitrate–nitrogen loadings to groundwater from blasting residue appears to be likely. However, these effects appear very likely to be either localized to groundwater within the mine permit area or will join surface flows beyond the mine disturbance. Water pumped from pits during dewatering may also have chemical characteristics inconsistent with surface flows.

The primary sources of concern for impacts on surface water quality appear to be discharges of sediments, metals, and nutrients. The Panel does not find that there is any evidence of risk of acid mine drainage as suggested by RMEC.

A large surface mine in rugged terrain will create numerous sources of sediments. The Panel believes, however, that sediment control can be achieved through the use of diversions, sedimentation ponds, and the careful addition of flocculants. The Panel notes that CRC's biological monitoring data from Luscar Creek, which drains a settling pond on the Luscar mine site, indicates that recovery of the benthic invertebrate community has occurred within a reasonable distance downstream of the discharge point.

With regard to metals loadings, the Panel notes that CRC's data for the Luscar Creek settling pond do show levels of a number of compounds at or above surface water quality guidelines. It is difficult for the Panel to assess the biological relevance of these levels. The Panel appreciates that Canada's Water Quality Criteria are designed to provide a high level of protection and so are

very conservative. The Panel also understands that in many instances, natural sources of various compounds may raise their concentrations in pristine receiving waters above the levels set in the objectives.

In this case, the Panel believes that there is sufficient evidence to confirm that both previous and current mining operations are increasing the concentrations of a number of metals and similar compounds in receiving waters above background levels, and in some instances above water quality objectives. While no evidence was provided which would suggest that these levels are having a significant environmental impact, the Panel concurs with the position taken by AEP that additional effort needs to be made by CRC to assess control technologies for these compounds and to ensure such controls, should the Cheviot Coal Project be approved, are put in place. The Panel also agrees with AEP that further analysis of the relevance of the water quality objectives be carried out and that the results of this analysis be reflected in any effluent discharge permits.

With regard to nutrient loadings, the Panel agrees that there is some risk of regional impacts if these are not carefully monitored and controlled. In this instance, the Panel is prepared to accept CRC's contention that it has been able to greatly reduce avoidable losses of nitrates from the Luscar mine and that these improvements can be readily transferred to the Cheviot mine. The Panel also notes, however, that there will be a period of some unknown length when nutrient loadings from both mines will be occurring. It will be very important that CRC's monitoring programs are adequate to identify if nutrient loadings are creating a risk of downstream eutrophication.

With regard to post–mining impacts on water quality, the Panel notes that some sources of sediments, metals, and nutrients likely will exist for at least a few years following mine closure. However, a potential indirect benefit of CRC's proposal to leave a number of end pit lakes in place will be the increased attenuation time for area surface runoff. The higher attenuation time, when coupled with the naturally low nutrient and high energy levels of area watersheds, can reasonably be expected to assist in mitigating any long–term effects on water quality.

With regard to cumulative effects, the Panel notes that there are a number of relatively small, but potentially cumulative, impacts to regional water quality occurring from a number of sources, particularly within the McLeod River watershed. The sources of these impacts include a range of industrial, municipal, and recreational activities. Based on the measurements of existing water quality, the Panel does not believe that development of the Cheviot Coal Project, at present levels of activity in the watershed, should result in an unacceptable reduction in regional water quality. However, effective monitoring and potentially increased controls on discharges, particularly nutrients, may be required to avoid curtailment of future development within the watershed.

The Cheviot Coal Project does create some opportunity for the accidental release of materials and associated impacts on water quality. There will be some increased risk of spills within the transportation corridor. However, this risk does not appear to be any larger than the risks associated with the Luscar mine, and CRC appears to have adequate spill response programs.

There is also a risk of accidental release from the Cheviot tailings pond. However, as noted in Section 3.1, the artificially reduced catchment basin above the pond, the relatively low toxicity of the fine tailings; and the measures taken by CRC to further reduce the risk of tailings loss, such as enclosing the tailings pipeline within a culvert, all appear to have adequately reduced the risk

to water quality from an accidental release.

With regard to monitoring programs, it appears that programs initiated by CRC to measure existing water quality, both for groundwater and surface water, will provide the basis for an adequate monitoring program. Prior to commencing its operations, CRC should, in discussions with AEP, agree to an appropriate level of long–term monitoring. The Panel believes that such a program should include biomonitoring (e.g. benthic invertebrate and algae communities), water chemistry (both in groundwater and surface water), and measurements of sediment levels. Stations should be located sufficiently far downstream to measure potential impacts from other mines, as well as potential impact on downstream water users (e.g. Edson, Cadomin, Alexis First Nation, and Smallboy Camp). The Panel is not convinced that monitoring of chronic toxicity using flowthrough assays (e.g. with caged rainbow trout or SPMDs) is currently warranted. However, CRC and AEP may wish to consider such approaches further, particularly if they would be of value in assessing the applicability of the various water quality criteria to CRC's licensed discharge levels.

3.3 Aquatic Habitat and Fisheries

3.3.1 Views of the Applicant

Study Area

The area examined by CRC in order to assess the potential effect on fisheries included the streams within the mine permit boundaries; plus investigations of tributaries of MacKenzie Creek and Whitehorse Creek and the main stems of the McLeod River, Cardinal River, MacKenzie Creek, and Whitehorse Creek downstream of the mine permit boundary. Two abandoned mine pits within the mine permit boundary were also investigated.

Existing Conditions

Five species of sport fish (bull trout, rainbow trout, brook trout, cutthroat trout, and mountain whitefish) occur in the study area. Bull trout, rainbow trout, and mountain whitefish are found in both the main stem of the McLeod River and MacKenzie Creek. A series of falls on the McLeod River upstream of the confluence with Whitehorse Creek appear to have prevented their migration upstream into the mine permit area. Brook trout, which are not native to the region and were stocked in the upstream reaches of the McLeod River are found throughout both drainages, but population densities are highest within the mine permit boundary. Bull trout are considered to be at risk in Alberta, while the rainbow trout in the study area may be derived from Athabasca rainbow trout, considered a potentially unique subspecies. Cutthroat trout are only found in the Cardinal River, where they were introduced between 1986–1988. Bull trout were the only other sport species observed by CRC in the Cardinal River.

CRC observed that stream habitat quality for fish in the region is generally directly related to stream energy which, in turn, is a function of gradient and discharge regime. Overall fisheries habitat quality in the lower reaches of the McLeod River was considered moderate, while habitat quality in the upper reaches was considered poor due to extensive periods of low flow and/or steep gradients. The majority of the tributaries to the upper McLeod River are high energy streams with extreme fluctuations in discharge, and habitat quality is generally low for adult fish

and moderate to low for juveniles. Habitat quality in the two abandoned pits was also considered to be low, but flow stabilization in the pits appeared to have improved downstream fisheries habitat in Cheviot Creek somewhat.

Habitat quality in the lower reaches of MacKenzie Creek was rated moderate to high due, in part, to the presence of bull trout spawning habitat. Habitat quality in the tributaries to MacKenzie Creek in those tributaries that supported fish was rated by CRC as moderate.

Existing habitat quality for fish in the Cardinal River was generally rated as moderate to low for adult cutthroat trout, while habitat quality in Red Cap Creek was rated as high for both juvenile cutthroat and bull trout.

Expected Effects

CRC noted that impacts on aquatic habitat and the associated fisheries could result from a number of changes in the parameters making up that habitat. These included: direct physical disturbance of banks, riparian vegetation, and substrates, etc; increases in sediment loads; and changes in flow regimes.

With regard to the transportation and utility corridor, CRC stated that its requirements to restore the existing rail line will result in construction work both along and within the McLeod River. This would include: the removal of old debris, the construction of one bridge crossing, the restoration of the river to its historic channel in order to avoid two other crossings, and the installation of five culverts. As well, significant armouring of the stream banks to prevent erosion would be needed along several locations. As a result, some direct physical damage to aquatic habitat and degradation to other habitat types due to siltation may result. Improper placement or design of culverts could also lead to the blockage of fish passage.

CRC noted that these impacts would be mitigated through minimizing the amount of instream work, and the use of other construction techniques designed to minimize sediments and other impacts. Restoration of the original river channel was predicted to eventually result in the replacement of an equivalent amount of habitat, and culvert design and placement would be done so as to ensure no loss of fish habitat.

Impacts from access road construction were expected by CRC to be similar to those from the rail line (e.g. sediment from cuts and fills, stream crossings, culverts, etc) with similar mitigation techniques. The road did appear to represent a potentially greater source of sediments after construction and, while these loadings would be reduced as much as possible, some sedimentation was expected. CRC noted, however, that the high energy of the McLeod River system would likely help to ensure that any impacts were insignificant over the life of the project. No impacts on aquatic habitat or fisheries from the powerline were predicted.

Impacts from the construction of the coal processing plant would be limited primarily to sediments from runoff over disturbed areas and, like other construction sources, CRC believed that these effects could be easily controlled and were insignificant. Operation of the coal processing plant would, however, require the development of a freshwater reservoir on Harris Creek and a tailings pond on Cheviot Creek. The impacts from the freshwater reservoir were considered to be insignificant and temporary, since a self–sustaining fish population could be

established in the reservoir over the life of the project and the reservoir would then be removed. However, the impacts of construction of the tailings pond on Cheviot Creek were felt, without compensation, to be significant since this would result in the permanent loss of fisheries habitat.

Several sources of impacts to aquatic habitat from the construction and operation of the surface mine were identified by CRC. Haul roads, during both the construction and operation phases, were identified as one potential source of impacts, particularly as sources of sediment. However, a number of techniques are available to avoid runoff from disturbed areas and CRC believed the effects of haul roads would, in general, be insignificant. Furthermore, culverts used in stream crossings would be designed to minimize habitat loss either directly or through reductions in fish movements.

A second source of sediment was surface runoff from disturbed areas on the mine site and from discharged pit water but, as with haul roads, CRC was confident, based in part on previous experience at the Luscar mine, that these effects could be controlled primarily through the use of settling ponds and flocculants.

A third source of impact identified by CRC was both the temporary and permanent diversion of streams from their existing channels. During temporary diversion downstream flows are maintained, but at least some fish habitat will be temporarily lost due to draining of the particular stream section. Populations upstream from the diversions will also be cut off at least partially from any immigration from downstream populations. In the case of the permanent diversions from Cheviot Creek, Thornton Creek, and two small tributaries of Red Cap Creek, some permanent loss of stream habitat will occur, although downstream habitat will be maintained. In CRC's view, these impacts could also not be mitigated without some form of compensation.

A fourth source of impact on aquatic habitat was changes to discharge regimes. As noted earlier in Section 3.1, stream flows are predicted to increase during periods of pit dewatering and decrease when end pit lakes are being filled. Little or no impact on aquatic habitat quality due to these activities was predicted, however, due to the relatively small changes in flow and CRC's ability to control the timing of these activities.

The final source of impacts from the construction and operation of the mine was the loss of various tributary stream sections due to their excavation and/or burial beneath rock dumps and rock drains. These losses would be permanent and were considered by CRC, in the absence of compensation, to be significant.

Compensation and Mitigation

CRC proposed two methods to compensate for the above loss of fish habitat. The first program was the introduction of native Athabasca rainbow trout into the upper McLeod River system into areas where natural blockages to migration exist. CRC estimated that approximately 11 km of stream habitat not currently used by Athabasca rainbow trout would be available and, because of its natural isolation from downstream populations, would provide a genetic refugium for the native species. CRC also noted the importance of ensuring that only native Athabasca trout be stocked in these waters in order to avoid contamination by other rainbow trout strains. When questioned about the possibility of extirpating the existing introduced populations of brook trout in the upper McLeod watershed and also introducing bull trout, CRC indicated that it was not

convinced that either program would likely be successful and so did not believe that these were appropriate compensation strategies.

The second component of CRC's fisheries compensation program was the establishment of seven mine pit lakes, six within the McLeod basin and one within the Cardinal basin, capable of supporting self–reproducing populations. CRC noted that these lakes would, in its view, not require ongoing stocking programs to maintain fish populations, provided that only catch and release angling was permitted once the lakes were turned over to provincial management authorities. CRC also noted that ongoing management of these lakes would, in its view, be the responsibility of the Alberta Fisheries Management Division.

In order to help address the time delay between the loss of stream habitat and the establishment of lake habitat, CRC advised that very early in the mining process it also intended to establish native Athabasca rainbow trout populations in a number of small overwintering ponds, with adjacent spawning habitat, in the upper McLeod watershed.

CRC noted that it had been able to establish a self–reproducing fish population in a mine pit lake at the Luscar mine site and was confident that it could do the same at the Cheviot Coal Project. CRC indicated that it planned to carry out extensive engineering in the seven end pits expected to be able to support self–reproducing fish population in order to ensure that features such as depth, surface area, and in particular the presence of littoral zones and spawning habitat were optimized for fish, within reasonable limits set by coal mining economics and the realities of pit geometry. In CRC's view, such lakes provided more than adequate compensation for lost stream habitat since both the amount and productivity of the replacement habitat would be greater than the existing habitat. Furthermore, CRC noted that there is a relative paucity of high mountain lake habitat in the region and that the new lakes would likely be attractive to regional anglers.

CRC observed that its conceptual mine plan called for another five lakes that would not, in its view, be able to support self–reproducing populations due to their physical features (e.g. inadequate depth). CRC noted that it did not plan to carry out stocking programs for these lakes, but did feel that these lakes would likely act as sources of food organisms for downstream aquatic habitat.

Accidents

The accidental release of fuels or other toxicants to the watershed (see Section 3.2) could ultimately have an effect on fisheries.

Cumulative Effects

Because the proposed lakes would eventually exceed the current production levels of the lost stream habitat, CRC viewed its fisheries compensation plan as providing a net positive cumulative effect to the region.

3.3.2 Views of the Interveners

The Mountain Park Association noted that it felt that CRC had not made sufficient effort to ensure that as few end pit lakes were constructed as possible. In their view, examples of such lakes (e.g. old quarry pits) were common in the area, were very unattractive, and of questionable

value as fisheries habitat.

The AWA Coalition noted that the project as proposed will result in the destruction of up to 10.9 km of valuable stream habitats. In their view, the proponent did not adequately explore other options to avoid the loss or harmful alteration of fish habitat, such as the selection of alternate sites, or the creation of "like for like" habitat, but rather went straight to compensation as the only possible option available to mitigate the effects of its proposal. AWA stated that CRC, even in using compensation to mitigate the effects of the project, had not provided any evidence that the program as proposed met the genetic and biological criteria needed to make such a program successful. Nor did they believe that CRC had adequately described the cumulative effects of their proposal on the area's fisheries resources. They also noted that no evidence of angler preference for such artificial lakes was provided.

The RMEC also took exception to the use of end pit lakes to compensate for lost stream fish habitat. In their view, the habitat to be lost would be defined under DFO policy as critical habitat, and therefore compensation was not an acceptable mitigation strategy. Both RMEC and the AWA Coalition also noted that no surveys had been done with regard to rare species of either fish or invertebrates in the areas of stream to be destroyed by the mining operations.

RMEC also strongly questioned CRC's assertion that the proposed end pit lakes would be at least as, and likely more, productive in terms of fish biomass than the existing area streams. First they noted that, in their view, CRC had not been able to estimate the actual productivity, particularly as sources of downstream food organisms, of the streams which it would be affecting. Second, RMEC stated that they felt that CRC had greatly overstated the likely productivity of the end pit lakes, noting that there were a number of questions regarding water quality and availability of juvenile rearing habitat. Finally, RMEC noted that, in their view, CRC had not adequately indicated how it intended to ensure that the proposed end pit lakes would be accessible to the public.

In its submission, AEP advised the Panel that it believed that while there were a number of uncertainties with regard to CRC's proposed fisheries compensation program, AEP was prepared to accept the replacement of riverine/stream habitat with self sustaining end pit lakes, with several caveats. In order to adequately compensate for lost fisheries habitat, AEP stated that such lakes must protect the integrity of both Athabasca rainbow trout and bull trout populations, be maintenance free, and have suitable water quality to support fish populations. AEP also suggested a number of features, such as the extent and depth of the littoral zone, that should be incorporated by CRC into the lake design.

AEP advised the Panel that it was also prepared to conditionally accept CRC's assessment that the impacts of the Cheviot Coal Project on bull trout populations would be insignificant. However, AEP did believe that monitoring programs on water flow rates (particularly groundwater discharge), water quality, temperature regimes, aquatic habitat integrity, and fish populations in the streams downstream of the disturbed areas was needed to ensure that CRC's predictions were borne out. AEP also indicated that the construction of additional overwintering ponds downstream of the mine permit boundary in the McLeod River could provide some additional mitigation of the impacts on fisheries.

Although AEP was prepared to accept the CRC proposal for the development of end pit lakes,

they did indicate that, in general, CRC would be expected to minimize the impacts of development on existing aquatic habitat. In particular, AEP noted that the protection of existing natural riparian habitat must be given precedence whenever possible. AEP also indicated that, as part of its approval process, CRC would be required to submit a contingency plan designed to address any future deficiencies identified in the current program. AEP also requested that the Panel require CRC, in consultation with AEP, to establish a fund which would cover the cost of stocking both the end pit lakes forecast to have sustainable fisheries populations, as well as those lakes which CRC did not expect to be self-sustaining. Such stocking programs would be designed to compensate, in part, for angling opportunities lost both during and following the closure of the Cheviot Coal Project. Finally, AEP indicated that it strongly supported the concept of establishing a protective corridor along MacKenzie Creek with little or no mine disturbance as a method to protect bull trout spawning and rearing habitat.

DFO also advised the panel of a number of its concerns regarding the potential impacts of the Cheviot Coal Project on fisheries habitat and CRC's proposed mitigation programs. The two general areas of concern were first, whether the loss/degradation of stream habitat due to mine development, in conjunction with the creation of multiple pit lakes, would significantly affect the overall function and integrity of the aquatic ecosystems involved; and second, whether the end pit lakes would provide suitable replacement habitat, particularly in terms of their acceptance by area residents.

More specific concerns raised by DFO included whether the data base gathered from Lac Des Roches was sufficient to justify CRC's confidence that end pit lakes within the Cheviot Coal Project would be able to sufficiently meet the needs of both bull trout and Athabasca rainbow trout populations so as to result in self-sustaining fish populations. DFO noted that the creation of end pit lakes may not provide adequate replacement for lost stream habitat, particularly for bull trout spawning and for juvenile rearing. DFO also indicated remaining concerns with the potential loss of groundwater discharge in area streams, particularly during the winter months, as well as reduced food availability due to the blockage of downstream movement of organic materials and benthic organisms by rock drains and the end pit lakes within the various stream courses.

DFO also advised the Panel that, in its view, the applicant had not adequately assessed the cumulative impacts of its development on the region with respect to not only other developments within the basin, but also the proposed cumulative effects of introducing a number of lakes into the headwaters of the various drainages. In particular, DFO were concerned with the relative impacts on anglers in the region. However, DFO went on to note that, given that the development will take place over a number of years, monitoring programs could be put in place to establish both the extent of impacts as well as the effectiveness of the proposed programs to mitigate these impacts. DFO stated that a flexible and adaptive approach to project management could allow new information to be incorporated during project development.

To meet the above information needs, DFO suggested that the applicant: identify areas of groundwater upswelling and confirm if used for spawning, assess instream flows, monitor annual spawning success, and measure juvenile production rates in river reaches below the proposed mine. Measurement of sediment generated, other water quality parameters, and benthic invertebrate production was also recommended. DFO also recommended that the applicant monitor areas where the blockage of fish passage may be problematic as well as the productivity

of the proposed end pit lakes. DFO believed that in the event such lakes did not adequately compensate for the loss of fish habitat, CRC should identify possible nearby streams for providing "like-for-like" habitat compensation.

At the hearing, DFO advised the Panel that, based on the evidence provided, it had identified some additional recommendations. First, that the mine plan be modified to the extent possible to minimize the use of rock dumps within watercourses. Second, that CRC should undertake an analysis of sediment samples downstream of the area where increased levels of polycyclic aromatic hydrocarbons (PAHs) were identified in surface runoff. Third, that CRC should undertake the analyses needed to demonstrate that fish in the area of mining activity are not accumulating metals, PAHs, or other contaminants that would affect their suitability for human consumption. Fourth, that sediment deposition downstream of the disturbed areas be monitored and fifth, that end pit lakes be designed so as to incorporate physical features which will maximize their productive capacity.

Trout Unlimited indicated that it had several concerns with the habitat compensation program being planned by CRC but did note that, if well planned and managed, unique opportunities did exist to improve existing fish habitat and to provide new habitat. Trout Unlimited, in its evidence, described the changes which had already occurred to the streams and fish populations in the area due to both natural factors (e.g. beaver activity) as well as from mining and increased angling pressure. Trout Unlimited was of the view that the regional fishery had already been degraded and that further losses must be avoided.

Trout Unlimited did not believe that the construction being proposed by CRC to upgrade the access road and rebuild the rail line within the McLeod River valley would, if adequate precautions were taken, have a significant effect on fish habitat. Trout Unlimited did believe that the mine development, particularly during the active stages, would have a significant effect on the area fishery and was not convinced that CRC had reduced the impacts of mining on the upstream drainages to the fullest extent possible. In particular, Trout Unlimited questioned whether the proposed mine plan had minimized the creation of rock dumps and drains within the affected drainage systems. Trout Unlimited was also very concerned that the proposed end pit lakes would not adequately compensate for the loss of stream habitat and believed that the proposed end pit lakes would not be as productive as CRC hoped.

However, Trout Unlimited also believed that several other opportunities existed for CRC to provide compensation for the impacts of mine development on regional fisheries. In particular, Trout Unlimited believed that CRC could carry out a number of activities in the reaches downstream of its proposed project to enhance fish habitat. These included the construction of pools and other forms of suitable overwintering and holding habitat in the McLeod River, MacKenzie Creek, and Red Cap Creek below the mine lease boundaries prior to commencement of mine operations. Winter flows, to be determined based on further direct measurements, were also proposed to be maintained within the downstream reaches of these streams. An additional step proposed by Trout Unlimited was the extirpation of brook trout populations in the upper reaches of the McLeod River in order to reduce competitive pressure and the risk of hybridization with introduced bull trout. Also recommended was the creation of additional fish habitat below stream diversions in order to compensate for the upstream losses caused by channel blockage, and ensuring that Cheviot Lake is engineered in a manner that will allow a self–sustaining population of fish to develop.

The Alberta Fish and Game Association expressed very similar concerns to those of Trout Unlimited, particularly with regard to the loss of natural stream habitat through excessive rock dumping external to the pits and the potential over–reliance by CRC on the ability of the end pit lakes to provide suitable and equally productive alternative habitat. The Alberta Fish and Game Association also expressed a strong desire that CRC would work to re-establish public access to disturbed lands as soon as possible in the mining process.

3.3.3 Views of the Panel

At the hearing, there was general agreement among all the parties that the Cheviot Coal Project will result in the permanent loss, as well as the short–term alteration, of fish habitat. There were differences of opinion, however, as to whether CRC's proposals first of all adequately minimized the loss or alteration of that habitat, and second, if the proposed mitigation strategy (i.e. compensation through the creation of end pit lakes) was appropriate.

With regard to minimization of habitat disturbance, the Panel believes that CRC's proposed development of both the transportation/utility corridor and the coal processing plant can be accomplished in a manner which adequately mitigates any short–term impacts on fisheries habitat. The primary risks from this would appear to be the restoration of the McLeod River to its former channel in order to avoid the need for two new bridges and the possible blockage to fish movement due to improper sizing or placement of the five proposed culverts. With regard to the restoration of the McLeod River, the Panel views this activity as in fact relatively consistent with natural stream processes, particularly in higher gradient rivers like the McLeod. Therefore, although the "new" habitat created will very likely not be initially as productive as the existing habitat, these effects should tend to be short lived, and, given the extent of the disturbed habitat relative to the size of the river, are very unlikely to have a measurable impact on fish populations. With regard to the use of culverts, since such activities are carried out on a relatively routine basis, the Panel sees no reason why they cannot be accomplished in this case with little or no impact.

The Cheviot Coal Project, as proposed by CRC, will clearly result in both the temporary and/or permanent diversion of several headwater streams and the permanent burial of others below rock drains. As a basic principle in the design of this project, the Panel believes that, as per the principles established by both AEP and DFO, wherever practical, CRC should attempt to leave existing aquatic habitat undisturbed. Where this is not feasible, the company should attempt to only disturb habitat temporarily (e.g. through diversions), with the goal of ultimately restoring the original habitat to the degree possible. Only if neither option is available should the company look to alternative measures for mitigation, including compensation.

In their submissions, a number of interveners questioned whether CRC had, in preparing its conceptual mine plan, minimized to the degree possible the disturbance of aquatic habitat. In particular, the number of end pit lakes and the interrelated size of the external rock dumps was questioned. However, based in part on the report prepared by Norwest, the Panel is prepared to accept that: (1) the present conceptual mine plan is based on reasonable engineering and economic assumptions, and (2) at least some options likely exist which will allow CRC to further reduce the level of disturbance to aquatic habitat, without unacceptable impacts on other social and environmental factors (e.g. the former Town of Mountain Park or wildlife). The Panel

expects CRC, as it continues to expand and refine its mine planning, to use as a key design criteria either avoiding or only temporarily disturbing aquatic habitat, wherever possible.

Notwithstanding CRC's efforts to avoid disturbance of aquatic habitat, the Panel agrees with CRC's view that some impacts cannot be avoided or mitigated, and also agrees that in this case compensation is appropriate. With regard to CRC's proposal to establish Athabasca rainbow trout populations in the upper McLeod River, the Panel believes that this is an appropriate approach and would strongly recommend that DFO accept this as partial compensation for lost habitat. Since the only competing salmonid is an introduced population of brook trout, CRC's proposal to create both an extension of the range as well as a genetic refugia for the native Athabasca rainbow trout seems to be a ecologically sound. The Panel is much less certain regarding the likely success of Trout Unlimited's proposal to attempt to eradicate brook trout from the upper McLeod, but will leave the decision regarding its feasibility and of the concept of stocking bull trout above the falls to the managers of the fisheries resource.

With regard to the use of end pit lakes to provide compensation, the Panel is prepared to accept the concept as having potential, but has a number of concerns regarding the ultimate productivity of these lakes. The Panel believes that CRC's success to date in creating Lac Des Roches, while it does suggest that lake creation is possible, is not yet definitive. The Panel notes that it is well established that productivity in new reservoirs is often much higher during their early stages, due to the influx of nutrients, and productivity can decline substantially with time. The Panel also agrees with DFO's view that CRC's population estimates for Lac Des Roches may be over reported. Other features of the proposed new lakes, such as their mean depth and their relatively high altitude, will also likely serve to further reduce productivity. Finally, a significant amount of engineering appears to be needed in order to produce the full range of habitats (e.g. spawning, juvenile rearing, and adult foraging habitat) required to create self-sustaining fish populations.

Despite the above concerns, the Panel recommends that DFO accept end pit lakes at this time as reasonable compensation for the habitat lost due to mining activities. The Panel agrees with the position taken by DFO at the hearing that there is sufficient time over the course of the development of the Cheviot Coal Project to carry out adaptive management practices. In particular, ongoing work at Lac Des Roches should provide significant direction for the future design of the proposed new lakes, including addressing the issues of public access and how to optimize the value of these lakes for area residents. Since there are no guarantees that CRC's proposed compensation programs will be successful, the Panel believes that it is reasonable for CRC to consider other forms of aquatic habitat improvement, possibly downstream of the mine permit boundary, as one component of its overall reclamation program, should ongoing monitoring and research indicate that CRC's proposed compensation program cannot adequately address impacts to the area's fisheries resources.

The Panel also notes that many of the streams being lost do not currently contain high quality fish habitat, but rather serve as a source of nutrients and food organisms for downstream reaches. The Panel believes that it is reasonable to assume that the presence of the end pit lakes will not have a significant negative effect on downstream flow of food and nutrients, but this assumption needs to be monitored. The Panel also believes that the attenuation of flows by the end pit lakes may in fact result in a net benefit to downstream fish habitat, particularly during the winter months. These effects, whether negative or positive, should be detectable by the requirements for monitoring programs described in Sections 3.1 and 3.2.

At the hearing, there was some discussion regarding the advisability of stocking the five lakes not expected by CRC to be able to support self–sustaining fish populations. Given the large number of unknowns regarding the eventual ecology of the end pit lakes, the acceptability of such lakes to anglers, or even the actual number of lakes that may result from mining, this concept appears to be somewhat premature at this time. The Panel would suggest that it will likely be important that CRC ensure that those lakes which can naturally compensate for lost fish production do so before any efforts are directed at creating a fishery which must be artificially maintained. The Panel also believes that CRC should be required, as the mine evolves, to justify, during the licensing stage, the need for each end pit lake on an individual basis, and if such justification cannot be provided, to carry out backfilling of the particular end pit.

With regard to accidents or malfunctions which may affect fish or aquatic habitat, the Panel believes that fuel spills, accidental release of unreacted flocculants, and the failure of the Cheviot tailings pond, with the associated large volumes of sediments, are the primary sources of concern. The first two events have some potential to result in short–term toxicity to fish, but the materials would be rapidly rendered non-toxic by natural physical and biological processes. The latter event, particularly if it occurred during a low flow period, would likely result in more chronic downstream effects to food organisms (i.e. invertebrates) and any fish eggs which had been deposited in gravel substrates prior to the release. However, the high energy nature of the area streams, combined with the low toxicity of the coal fines, should eventually result in the flushing and removal of these materials without any undue environmental damage. The Panel also believes, as previously noted in Sections 3.1 and 3.2, that CRC has put in place adequate measures to either prevent or mitigate the effects of these events.

In assessing the cumulative effects of the Cheviot Coal Project, the Panel notes that little or no data were made available at the hearing on the current use of the fish resources of the mine permit area by anglers. This is of some concern since the eventual acceptance of the end pit lakes for lost stream fishing opportunities by area anglers is a component of CRC's compensation program. The Panel also notes the evidence by Trout Unlimited that local angling pressures appear to have increased, particularly as access has improved. Since the Cheviot Coal Project will, on one hand, improve access to the upper McLeod River valley below the mine permit boundary and, on the other, reduce access to traditional fisheries within the mine permit boundary, it seems reasonable to presume that this will also result in some cumulative effects on angling pressure in the region. The Panel agrees with DFO, however, that if the Cheviot Coal Project proceeds, there will be further opportunities to gather these data during the early development stages, and believes that the risk that the Cheviot Coal Project will result in significant cumulative effects on regional angling opportunities is small.

The Panel also notes that CRC, in attempting to carry out an assessment of potential cumulative effects (CEA), stated that it was unable to obtain the necessary information from other industry sources, particularly forestry. The Panel can appreciate the difficulty that this creates for an applicant. Given that a CEA is a requirement of both the provincial and federal EIA process, the Panel believes that the government has a responsibility for ensuring either that needed data can be collected or alternatively, that the current legislation is amended to recognize the limitations that lack of cooperation between industry sectors or companies within a sector can create for a CEA. In this particular case, the Panel notes that CRC was able to use data from the Tri–Creeks watershed as a surrogate measure of the likely effects of modern forestry practices on both

discharge rates and water quality, and found little evidence of impact. Therefore, the Panel does not expect the cumulative effects of coal mining and forestry at present/predicted levels to have a significant impact on regional fisheries resources, or reduce their capacity as renewable resources, to meet either present or future needs.

At the hearing a range of monitoring and follow up programs were discussed. After reviewing the various proposals, the Panel believes that, as a minimum, CRC should be required to:

(1) Establish an ongoing research program into the aquatic ecology of Lac Des Roches. Lac Des Roches provides CRC with an excellent template for the proposed end pit lakes at the Cheviot Coal Project. Data elements which CRC should consider monitoring include: ongoing water chemistry measurements, particularly in the anaerobic zone and at the interface of that zone with areas influenced by turnover; water temperature, nutrient, and biomass differentials between lake inflow and outflow; and fish population dynamics, including both biomass and life history data. Additional data on the use of Lac Des Roches by anglers would also be of value.

(2) Establish minimum instream flow values in the drainages directly affected by mine development. Flow rates particularly during the late summer and winter months would appear to be among the primary elements controlling habitat quality and the ability of the regional streams to support fish populations. Additional data are needed to establish minimum flow rates that will need to be maintained during the various phases of mining to ensure that fish habitat is protected.

In addition to the above, CRC will also need to establish the water quality and biomonitoring programs described in Section 3.2. CRC will also need to develop a program to monitor the relative success of its proposal to establish native rainbow trout stocks within the mine site prior to the completion of the end pit lakes. Finally, CRC will need to develop a program designed to identify potential sites where other forms of mitigation for the loss of fish habitat (e.g. "like for like") could potentially be undertaken, should its proposed compensation strategies not prove to be as effective as expected. CRC may also wish to consider carrying out some experiments in such habitat enhancement techniques (e.g. creation of overwintering pools) within the area of the McLeod River where the original channel is to be restored. Assuming that there are sites within that reach where such work would be appropriate, the combination of absence of flow and the presence of construction equipment may make such work particularly cost effective.

4 TERRESTRIAL EFFECTS

The Cheviot Coal Project has the potential to affect several components of the terrestrial environment. In a number of cases, CRC selected VECs for its analysis of the terrestrial environmental effects of the Cheviot Coal Project and focused its assessment on these. These have been addressed in this report in the following sections:

- vegetation (botanical and forest resources),
- soils and terrain,
- carnivores,
- ungulates,
- small mammals and amphibians,
- Harlequin ducks, and
- neotropical and other breeding birds and raptors.

Clearly there are linkages between these components and the Panel has taken these into account in its review and analysis of the environmental effects of the Cheviot Coal Project.

4.1 Vegetation

4.1.1 Views of the Applicant

Study Area

Botanical resources (vegetation and ecosites) were mapped by CRC at a 1:15 000 scale for the entire mine permit boundary area (102 km^2). Mapping was based on data collected from 100 sites distributed throughout the study area. Similar mapping was carried out within the proposed transportation and utilities corridor north to the junction with Highway 40. Vegetation resources were measured along the transportation and utilities corridor over a distance of 16 km and a width of 500 to 1000 m, with the area surrounding Cadomin the widest portion. Forest resources were also measured within the mine permit boundary and along the corridor.

Existing Conditions

Three ecoclimatic zones (subalpine, montane, and boreal-cordilleran, with subalpine the most common) were described within the transportation and utilities corridor, while four ecoclimatic communities (upper boreal–cordilleran, subalpine, alpine, and montane, with subalpine the most common) were found to occur within the mine perimeter. CRC indicated that 16 vegetative community types (6 coniferous forest types, 8 shrub types, and 2 grassland meadow types) were present within this area. Coniferous forests (primarily lodgepole pine) covered approximately

57 per cent of the area. Willows and dwarf birch shrub covered another 29 per cent. Less than 1 per cent was classified as disturbed, another 2 per cent was unvegetated or poorly vegetated, and 7 1/2 per cent was classified as alpine.

Of the 16 plant communities, 2 were considered to have particular ecological significance. These were a potentially old growth Englemann spruce–subalpine fir community and an alpine white dryad-kobresia community. The former was considered important due to its age, successional status, and relative rarity in Alberta. The latter was considered important due to its sensitivity to disturbance, limited areal extent, and the occurrence of numerous provincially and nationally significant plant species within the community.

In its application, CRC stated that a total of 477 plant species, including 74 non-vascular taxa, were found or reported in the Cheviot Coal Project area. CRC noted that further surveys would likely extend the list of non-vascular plants, particularly lichens, since it had focused primarily on vascular species. CRC also noted that because the area had historically been easily accessible and somewhat disturbed, a number of introduced species occurred. CRC observed that approximately 92 per cent of the species that occurred within the mine area were also reported in Banff and Jasper National Parks, while approximately 83 per cent of the species within the study area were also found on the Cardinal Divide.

CRC noted that within the mine permit area and the transportation and utilities corridor there were 35 plant species considered to be provincially significant. Four are classified as critically imperiled, 27 as imperiled, and 4 as rare. Three species are also considered to be of national significance. Many of these plants are associated with alpine/arctic environments and are parts of disjunct populations at the southern extent of their range. The alpine zone of Prospect Mountain was particularly noteworthy for the number of provincially and nationally significant species.

In terms of existing forest resources, CRC reported that 6400 ha (64 per cent) of the mine permit area was forested (i.e. a forest cover of at least 6 per cent). Much of this was lodgepole pine which originated following fires in the 1920s. The model age of stands was 75 years, but some stands of over 300 years in age also occurred. Approximately 25 per cent of the forested areas were classified, using the Alberta Vegetative Inventory, as commercially unproductive, with 72 per cent rated as "fair" productivity. However, using methods developed by Alberta Lands and Forests (now AEP), CRC estimated that only 43 per cent of the forested land would be rated as productive. Average gross volume of merchantable timber was 58 m^3/ha and total timber volume is 418 000 m^3. Within the area stated for direct mining disturbance, 103 000 m^3 total timber volume was estimated to be in place, with 58 500 m^3 in commercially productive and recoverable stands.

Expected Effects

CRC considered separately the effects on vegetative resources of development within the mine permit boundary, including the coal processing plant, and of development of the transportation and utilities corridor.

The Cheviot mine is expected to encompass an area of about 3007 ha with, approximately 2739 ha of land directly impacted by the development and with up to 7 per cent of the total mined area retaining its present vegetation cover. Based on its current mine development proposals, CRC believed that the impacts to vegetation resources would include:

- the destruction of native vegetation, including 31 and 29 ha, respectively of the ecologically significant white dryad-kobresia and Engelmann spruce-subalpine fir communities;
- the potential loss of individuals from provincially and nationally significant plant species populations;
- a general reduction in floristic and vegetation diversity;
- an increase in the abundance of non-native species;
- the replacement of terrestrial ecosystems with standing water bodies;
- the conversion of ridged and rolling topography to a terraced landscape; and
- the creation of non-vegetated highwalls, footwalls, and related rock scarp.

CRC also noted that vegetation within reclaimed areas will require from one to several decades of growth to develop a physiognomy that resembles existing plant communities.

CRC provided an estimate, based on its current planning, of the likely changes in vegetation types pre– and post–mining. CRC predicted a net loss of 355 ha (12 per cent of total vegetation) of coniferous forest, 72 ha (3 per cent) of open forest/shrublands, and 255 ha (9 per cent) of mixed vegetation. The vegetation type showing the greatest increase in occurrence was grasslands (542 ha or 19 per cent). Unvegetated areas (e.g. highwalls) were also predicted to increase in area (22 ha or 1 per cent), as were lakes (122 ha or 4 per cent).

CRC noted that many impacts on vegetation will be major in the local area, but felt that mitigation (i.e. reclamation) would, in most cases, reduce the overall impacts to an insignificant level. In final argument CRC noted that, although concerns regarding mosses and lichens had been raised at the hearing, these had not been identified as VECs in the EIA process, and subsequently had received less attention. In any event, CRC stated that it believed the impacts on these species would also be insignificant. The two exceptions were the loss of old growth Engelmann spruce-subalpine fir communities and the potential loss of members of provincially and nationally significant plant populations. CRC observed that it expected that at least 5 to 20 years, 20 to 40 years, and 40 to 60 years of plant growth will be required in grassland, shrubland, and forest communities, respectively, to fully mitigate the impact of vegetation losses resulting from mining. After about 80 to 100 years, impacts considered to be amenable to mitigation would be expected to be insignificant.

With regard to the transportation and utilities corridor, CRC believed that restoration of the

railway, upgrading of the highway access, and extension of the transmission line would disturb a total of 126 ha, including 85 ha of native vegetation. The only potentially significant impacts were risks to two provincially significant plant species (***Ranunculus occidentalis, Schistidium tenerum***), of which the latter is critically imperiled.

CRC stated that, in its view, the loss of vegetation in itself was not necessarily a major ecological problem because of the widespread distribution in the region of most of the plant species and plant communities. Furthermore, natural processes tended to promote the revegetation of disturbed areas through natural succession, although CRC did note that significant amounts of time may be required to complete the process. However, CRC did also note that there are indirect impacts that can occur as a result of the destruction of natural vegetation cover. These include: the loss of wildlife habitat; creation of barriers to wildlife movement; increased surface runoff, erosion, and a corresponding degradation of fluvial environments and fish habitat; and aesthetic concerns.

CRC described a number of steps it proposed to take to help mitigate the adverse effects of the mine. These included:

(1) taking an ecological and landscape perspective to revegetation;

(2) integrating the post-mining landscape into the surrounding natural conditions;

(3) creating a revegetation plan that focuses on the development of plant communities;

(4) avoiding disturbing vegetation that is considered ecologically significant where possible;

(5) assessing further significant plant species occurrence and abundance within the disturbance zone on Prospect Mountain prior to development in this area;

(6) transplanting of selected significant species where avoidance is not possible;

(7) minimizing the amount of vegetation that will be disturbed;

(8) salvaging organic debris and the biologically active portion of the mineral soil for use in reclamation;

(9) creating irregular surfaces for reclamation planting;

(10) integrating the proposed water-filled mine pits into the surrounding landscape;

(11) protecting the reclaimed post-mining landscape from human disturbance until the vegetation has become re-established through appropriate land management; and

(12) conducting reclamation planning and mine rehabilitation using a multi-disciplinary team.

In order to mitigate impacts along the corridor, CRC planned to implement the following

mitigation measures:

(1) Disturbance to vegetation would be minimized.

(2) Sites scheduled for development would be stripped of both woody debris and the biologically active portion of the soil (upper 10 to 15 cm) for use in revegetation wherever possible.

(3) Disturbed areas (roadsides, major cuts and fills, and borrow areas) would be reclaimed with plants that would eventually produce vegetation similar to existing native communities.

(4) Culverts would be installed in wetland drainage areas.

(5) Abandoned portions of the existing railway and roadway would be revegetated, thereby restoring previously disturbed habitat.

(6) Transplantation of ***Ranunculus occidentalis*** would be carried out if encountered and disturbance is unavoidable.

(7) The road right of way would not be cleared on the west side of the upgraded Grave Flats Road in the vicinity of the ***Schistidium tenerum*** habitat, and one transmission pole will be relocated.

(8) The transmission line right of way would not be cleared of native vegetation, except when forest cover occurs or plants exceed 3.5 m in height.

(9) Chemical and mechanical methods would not be used to control vegetation regrowth on cleared portions of the transmission line right of way unless it directly interferes with power lines.

With regard to residual and cumulative effects, CRC predicted that effects related to the loss of native vegetation, with the exception of ecologically significant communities or species, would be insignificant. With regard to the Englemann spruce–subalpine fir community, CRC noted that the main area threatened by development was a 29 ha area in the Powerhouse Creek vicinity where a rock dump is proposed. CRC advised the Panel that it intended to review the status of this community with AEP since CRC was not at present convinced of its ecological value. Based on the results of this re–evaluation, one option would be to relocate the proposed rock dump.

As for the white dryad-kobresia community, CRC noted that this 31 ha alpine community was located in upper Prospect Creek and, as a result, would not be mined for approximately 10 years, allowing for further planning. Further, this community was, in its view, part of a larger 635 ha community and so its loss would not be significant. CRC proposed to compensate, should the loss of this vegetative community prove to be unavoidable, by assisting in reclamation of nearby alpine areas.

In its application, CRC described its current conceptual plan for reclamation. CRC noted that the

fundamental principle that underlies the definition of reclamation success, as set out by AEP, is that land capability remain equivalent to the original (pre–construction) or representative (adjacent) site conditions, with due consideration for construction norms at the time of development. CRC also noted that for its Luscar mine, acceptable post–mining land uses are contained in its approvals from AEP. In that case, acceptable reclamation includes the creation of ungulate wildlife habitat with some recreational and forestry uses where climate permits.

CRC noted that reclamation planning had evolved significantly over the years at its Luscar mine. The original goal at the outset of mining in the mid-1970s was confirming what, if anything, would grow. This evolved, in part because of very high maintenance costs, to attempts to develop self–sustaining cover vegetation, with native species, particularly grasses, preferred, again in part to reduce maintenance costs. More recently, reclamation had focused on the process of plant succession from a community of revegetation species (native or introduced) to indigenous native plant communities. CRC noted that at the Luscar mine a productive, self–sustaining plant cover capable of supporting a large wildlife population has been established. However, plant succession to native vegetation, particularly vascular plants, is occurring slowly. The low invasion rate was felt to be a function of the revegetation strategy used (i.e. forage production rather than establishing native plants); the distance to the forest edge which is a source of native species; and low opportunities for native species to become established in areas with a high cover of introduced species.

CRC stated that its reclamation program would be designed to meet several goals, including establishing wildlife habitat, particularly for elk (e.g. grasses, legumes as food, woody plants as food and cover); enhancement of recreation (e.g. wildlife viewing, aesthetics, hiking opportunities); reforestation; and maximization of diversity through creation of a diverse large and small scale rolling topography and the use of native species with a broad genetic base. However, CRC emphasized in both its application and at the hearing that watershed protection, through the establishment of vegetation that will control erosion and rebuild soil, was its top priority.

To meet the goal of erosion control, CRC proposed, with few exceptions, to reclaim all slopes initially with a grass/legume mix to achieve the needed ground cover (80 per cent). This process is assisted by creating a rough micro–topography (i.e. mounds and hollows of 5–60 cm depth in the topsoil). Hand and helicopter broadcasting of seed, rather than a crawler tracker as is currently used at the Luscar mine, may be used in order to preserve the micro–topographic features. This reseeding approach may also increase the risk of localized areas of bare ground, but CRC did not expect that this would increase the risk of erosion. Transplanting of commercial forest species and shrubs and the direct placement of topsoil and the associated seed bank were also proposed, while further work was felt necessary to determine if sod transplants would be feasible. The latter was felt to be particularly useful in providing rapid runoff control, watershed protection, rescue of significant plant species, and lakeshore restoration.

The current Luscar mine seed mixture, since it has proven effective under local climatic conditions, was proposed by CRC as a starting point for reclamation at the Cheviot mine. However, further refinements would need to be carried out to remove more aggressive non–native species and replace these with new seed sources. CRC noted its use of native seeds is

constrained by both seed availability and by competing revegetation goals such as erosion control. CRC described the results of seed trials at Mountain Park which it believed showed promise. CRC also noted that it had success regenerating willow using fresh topsoil from areas previously containing willow with no reseeding. This method was felt to provide the best opportunity to re–establish woody species. CRC advised the Panel that it estimated high levels of native plant re–establishment, including woody species, within 15–20 years on reclaimed lands.

CRC observed that impacts to the timber resources in the vicinity of the mine development area would be limited to those areas directly disturbed by the mine itself, the plant site, and the transportation and utilities corridor.

Commercial forestry is presently limited to the south–east corner of the mine permit area, which is part of the Weldwood Forestry Management Agreement (FMA). Weldwood has scheduled timber harvest for the area for the year 2020. The forested areas outside of the FMA is part of Forestry Management Unit (FMU) E05, and although considered open to commercial forestry, is unallocated at present.

CRC stated that within the total area of Weldwood's FMA, the overall impact of the disturbance is relatively minor. The amount of timber affected represents 0.7 per cent of the annual allowable cut for one year. CRC anticipated that this loss in volume could be offset by the timber volume originating from the stands harvested by the mine development process. In its application, CRC committed to coordinate timber harvest operations with the FMA holder, and noted it would be revegetating specific areas to commercial forests.

In areas outside the FMA but within the project area, the expected disturbance to commercial forests is about 921 ha. This loss of merchantable timber, particularly given CRC's reclamation programs, was not considered to be significant.

CRC noted that post-mining topography will result in some permanent land base features which will affect future timber operations. For example, highwalls will affect accessibility of stands, recreational lakes may require buffers, and access will be improved. The extent of this type of impact was also expected to be minor and could be mitigated with careful reclamation planning. The disturbance associated with the McLeod River transportation and utilities corridor would, on the other hand, be long term. However, the extent of the impact on forest resources would, in CRC's view, be minimal.

In its application, CRC addressed possible risks to the ecological integrity of the Cardinal Divide Natural Area which could result from the Cheviot Coal Project. Because its native plant communities are a key feature of the Cardinal Divide, CRC noted that the introduction of alien species could have a negative effect. At present, there are only two alien species (common dandelion, red clover) found in the alpine area of the Cardinal Divide, while three clover species have been found in the Prospect Creek alpine areas, possibly resulting from previous reclamation work.

CRC observed that two of the prerequisites for alien plant invasions; that is, heavy ground

disturbance, in this case trails created by cars, horses, and hikers, and a nearby source of seed or propagules, have been present at the Cardinal Divide for possibly 20 years. Despite this very little invasion has occurred. CRC believed this was primarily due to the extreme climatic conditions on the Cardinal Divide, which allows only the hardiest native species to survive. Two species, red clover and fodder vetch, which are currently found in the Mountain Park area, were felt to be possible sources of invaders into the Cardinal Divide. The former has been spread extensively by pastured horses and the range of the latter also appears to be increasing.

CRC did see some risk of invasion of the Cardinal Divide Natural Area by the licensed varieties and ecovars of native grass and legume species being considered for use in reclamation at the Cheviot mine. However, because the genetic selection process used in creating these varieties is usually directed at improving the agricultural production of the species, CRC felt it unlikely that these varieties would also have a genetic advantage in the climatically harsh, competitive environment already existing on the Cardinal Divide. Furthermore, genetic segregation would cause the new varieties to return to their original genetic make–up within a few generations.

CRC also believed that some risk of cross–pollination with introduced species and therefore changes in the genetic make–up of the species in the Cardinal Divide exists. This was in part due to the fact that the area to be revegetated at the Cheviot mine (3000 ha) was quite large in relation to the Cardinal Divide (6000 ha). Because distances between the two sites would be as small as 300 m in the Prospect Creek area, this risk appeared to be quite possible. The result could be increased inbreeding and the resulting loss of genetic diversity and inbreeding depression.

In order to mitigate these possible impacts on the Cardinal Divide Natural Area, CRC proposed to:

(1) avoid creating any additional access for motorized vehicles into the Cardinal Divide Natural Area and therefore sources of ground disturbance and seed spreading;

(2) maintain a 1000 m buffer zone between revegetated areas and alpine areas of Cardinal Divide;

(3) avoid the introduction of new alien species;

(4) consult with government land managers and the stewards of the Cardinal Divide before introducing any new species and introduce such species cautiously; and

(5) avoid or limit the use of cross–pollinated, native alpine species in revegetation mixes.

4.1.2 Views of the Interveners

The AWA Coalition raised a number of concerns regarding the impacts of the Cheviot Coal Project on the existing vegetation resources and the efficiency of the proposed revegetation program. In general, they did not believe CRC had adequately addressed post–development vegetation in terms of regional ecosystem integrity, habitat diversity, or habitat quantity, as required by the EIA Terms of Reference. Among other issues, they noted that CRC had to

depend on natural successional patterns over a century to return the area to a stable ecological condition and that, as a result of mining, significant changes in the post–reclamation landscape and the proportions of various community types would occur.

None of these factors, in its view, allowed CRC to comply with AEP's objective of returning the Cheviot mine site to equivalent land capability . In particular, the AWA Coalition felt that the overall reclamation plan had undue emphasis on returning the land to very specific land uses (e.g. forestry, elk habitat), rather than to equivalent capacity for all ecosystem residents. The AWA Coalition took particular exception to the contention by CRC that reclamation of the Cheviot Coal Project would not be unlike natural succession patterns following a large fire, since, they noted, fire processes normally leave significant amounts of vegetation biomass. Other specific concerns included the large increase (140 ha) of unvegetated areas and the replacement of late succession forests with grasses and forbes. The AWA Coalition also questioned the adequacy of CRC's surveys for rare plant species.

The AWA Coalition noted that, as a result of mine development, there would be a loss of a number of important plant communities. They felt that the loss of the entire 124 ha of potential old growth Englemann spruce community type should be of concern, and not just that proportion which is presently old growth, since without such successional forests there would not be additions to the old growth communities and so a significant risk of future loss in biodiversity. The AWA Coalition also believed that CRC had frequently understated the time frame for reclamation, particularly with regard to habitat structure.

The AWA Coalition also disagreed strongly with CRC's proposal for mitigation for the loss of the white dryad-kobresia community. They also believed that CRC was misinterpreting the intent of the Coal Conservation Act in stating that failing to mine that area would result in a failure to meet EUB requirements to maximize the recovery of coal resources.

The Alpine Club Coalition had a number of suggestions regarding CRC's proposals and particularly with regard to improving the protection of the Cardinal Divide Natural Area. They pointed out that as volunteer stewards of the Natural Area, they had been actively working to reclaim disturbed areas through revegetation with native seed, through the removal of fire pits, and the blocking of vehicle access, and did not wish to see this work lost through impacts from the Cheviot Coal Project.

In the view of the Alpine Club Coalition, a number of conditions on any approval of the Cheviot Coal Project, as well as associated follow–up programs, were warranted. Their suggested conditions and follow–up programs designed to address significant adverse effects on rare plant species and significant plant communities were that:

(1) the white dryad-kobresia community be excluded from the mine development plan;

(2) the dumping of waste rock or other mining activities in old growth Engelmann spruce/subalpine fir communities not be permitted;

(3) additional studies to determine the impacts on rare plant species (including large–scale

mapping) and an associated monitoring program be required; and

(4) an assessment of the impacts on mosses and any required mitigation be carried out.

The suggested conditions and follow–up programs by the Alpine Club Coalition that addressed the reclamation of disturbed vegetation were that:

(1) reclamation should favour the use of native species, include native non–aggressive, non–persistent legumes; native grass cultivars; native shrubs; and early seral native species;

(2) CRC place a priority on finding local seed sources with collection beginning prior to disturbance;

(3) plants used to reclaim wetlands only be from areas to be disturbed by the project or from container–grown stock;

(4) CRC thoroughly evaluate the ecology and supply potential for native plants; and

(5) a precise program to measure reclamation success, including an expert advisory committee to advise CRC, be established.

In order to address potential impacts to the Cardinal Divide Natural Area, the Alpine Club Coalition proposed that:

(1) a 1 km (1000 m) undisturbed buffer zone between the mine and Cardinal Divide be established;

(2) lands in Sections 27 and 30-45-23 W5M and in Sections 35 and 36-45-24 W5M should be added to the Cardinal Divide Natural Area in order to better protect their rare plant communities;

(3) the Coal Branch Access Management Plan be revised to take into account the Cheviot Coal Project and steps taken to implement the proposed measures. In particular, Forest Land Use Zones needed to be established; and

(4) the use of rock dumps external to the pits should be minimized and soil salvage from undisturbed areas should be prevented.

At the hearing, the Alpine Club Coalition noted that while the upper Prospect Creek area contained less than 4 per cent of the coal available to be mined by CRC, it represented a very large proportion of the significant plant communities likely to be affected, and therefore mining in this area was not in the public interest.

AEP noted at the hearing that it had regulatory authority over CRC's proposed reclamation plans, including setting priorities for various end uses of the reclaimed lands (e.g. wildlife, forestry, etc). AEP advised the Panel that CRC's conceptual reclamation plan met its requirements, with the exception of selected aspects of lake reclamation (see Section 3.3) and conservation and

replacement of topsoil (see Section 4.3). With regard to vegetative impacts, AEP's position was that CRC's reclamation plan must:

(1) create vegetative communities capable of evolving naturally to tree cover or open forest scrub;

(2) use direct placement of topsoil to preserve native seed and enhance native plant recolonization;

(3) return the area to approximately similar cover patterns, with particular emphasis on watershed protection; and

(4) minimize impacts on ecologically significant vegetation types where possible.

AEP stated that it believed these issues could be addressed during its approval process.

4.1.3 Views of the Panel

In considering the potential impacts of the Cheviot Coal Project on regional vegetative resources, the Panel believes that the issues it must consider are:

(1) whether there are any aspects of the area's vegetative resources, including forests, which are so sensitive that they would preclude development;

(2) whether CRC's proposed conceptual reclamation programs are adequate to ensure a reasonable probability of restoring land use capacity, protecting area watersheds, re–establishing biodiversity, and matching natural vegetation succession patterns; and

(3) whether there are specific plant communities within the project area that require added protection.

With regard to the first question, the Panel is prepared to accept the evidence from the various parties that, within the Mountain Park/Cardinal Divide region as a whole, there exists an extremely complex and diverse set of vegetative communities, with a number of rare and/or unique species. Furthermore, given the extensive study done by various parties to the hearing, the Panel is also prepared to accept that, while regional plant surveys may not have been carried out in a level of detail satisfactory to everyone, there is sufficient information to determine to an acceptable level the current status of the plant communities within the Cheviot Coal Project area.

The Panel notes that surface mining will, at least in the near term, result in the complete removal of much of the vegetative cover within the areas directly disturbed by either pit development or waste rock dumping. Furthermore, while the Panel believes that CRC's proposal to avoid or relocate rare plant species, while worthwhile, is likely to be marginally successful at best. However, the Panel notes that plant species are capable of re–colonizing heavily disturbed areas through a series of successional steps made up of various community types. In this case, the Panel accepts that, while the final site topography will be changed, most of the general terrain,

soils, and certainly the climatic features, will remain. Therefore, it should be possible for CRC to design a reclamation program capable of returning the site to much of its past vegetative diversity.

In coming to the above conclusion, the Panel is prepared to accept that it is likely that the proportions of the various plant communities on the reclaimed Cheviot mine site will certainly, in the short term and possibly over a much longer term, be changed. The Panel does not, however, see such changes as inherently unacceptable. For example, while the loss of certain plant communities will disadvantage some wildlife species, others will benefit. Therefore, the Panel believes that, on a community basis, the development of the Cheviot Coal Project should not result in an unacceptable loss of vegetative resources or, as a result, an unacceptable risk of loss of biodiversity in other terrestrial species.

With regard to the proposed reclamation program, the Panel believes that CRC, given its experience at the Luscar mine and the information gained there, will be able to create a reclaimed environment which, while it will not initially contain late successional species, will be capable of returning eventually to such stages. The Panel notes that AEP, in its evidence, also accepts that successful reclamation of the site is possible and further, re–emphasized its intention to ensure that the ultimate reclamation plan was designed to allow natural plant successional patterns to occur. The Panel is also prepared to accept that for the mine site to ultimately return to a natural vegetative structure will take several decades at least. While such a time frame may be frustrating to some, the Panel notes that this is not significantly different from the time frames associated with either natural successional processes (e.g. following a severe fire) or other man–induced succession (e.g. following clear cutting). The Panel does believe CRC can and should be required to re–establish later successional shrub and tree communities through a proactive planting program rather than through natural succession.

Key to recreating an ecosystem capable of returning to natural successional patterns will be ensuring that the basic requirements for plant growth are in place. To that end, the Panel would strongly recommend that CRC ensure that topsoil is, to the degree possible, directly placed onto disturbed areas; that roughness features are built into reclaimed landscapes as is currently proposed; that native vegetation is used wherever practical; and that undisturbed areas of vegetation be maintained wherever possible throughout the area to act as colonization sources. With regard to the use of native species, the Panel also notes that neither CRC nor the Alpine Club Coalition view the use of native species as a panacea and would strongly agree that caution and common sense will need to prevail in the selection of appropriate native species in order to ensure conflicting reclamation goals are met. The Panel also agrees with the suggestion that CRC seriously consider establishing an advisory committee to comment on its proposed reclamation programs as well as a system designed to accurately measure its reclamation success.

With regard to forestry, the Panel notes that CRC has predicted that the loss of forestry resources due to mine development, in a regional context, will be minor and can be further alleviated by working with the region's forestry companies. The Panel accepts that contention and notes it was not challenged at the hearing. With regard to longer–term impacts on forestry, AEP, in its testimony, advised the Panel that its first objective regarding reclamation will be protection of the watershed, with longer–term reclamation designed to approximate existing vegetative cover

patterns. Presumably this may, to some degree, reduce long–term forestry potential in the area. The Panel, however, believes that in this case, AEP's emphasis on returning features such as wildlife habitat, even if it occurs at a cost to the ultimate amount of merchantable timber that will be available for future harvest, is an appropriate trade–off, and would strongly encourage both AEP and CRC to continue to follow this path. This small amount of lost forest capability would in no way compromise the province's ability to supply the needs of future generations with this renewable resource.

With regard to whether specific plant communities within the area potentially affected by the Cheviot Coal Project require further protection, the Panel believes that there are three areas of particular concern. The first is the presence of old growth and/or late successional Englemann spruce/subalpine fir communities. The Panel finds as reasonable the argument made by the AWA Coalition that even if such communities are not currently old growth, it is necessary to maintain a continuum of forest ages in order to also maintain final climax forests as part of the overall biological community.

The Panel notes that, in particular, a relatively small area of the Englemann spruce/subalpine fir community that exists in the area of Powerhouse Creek was of concern to interveners. The Panel accepts that CRC, in creating the mine plan for this area, had attempted to deal with a number of conflicting issues, and that further protection of the vegetative resources of this area will have impacts on other resources, including coal recovery and the former Town of Mountain Park. The Panel is unable, based on the available evidence, to determine if CRC's current proposal is still the best option. However, the Panel will require, should the Cheviot Coal Project be approved, that CRC, as its mine planning continues to evolve, re–examine its options with regard to Powerhouse Creek in order to reconfirm that the disturbance of this plant community cannot be avoided without unacceptable impacts on other resources. CRC should also be encouraged to examine other areas of the mine containing Englemann spruce/subalpine fir communities in order to determine if impacts on these can also be further reduced.

With respect to the need to exclude upper Prospect Creek from further mining, the Panel agrees that this area contains a disproportionately high percentage of the rare and/or disjunct species within the mine site. The Panel does not expect that CRC's proposals (e.g. removal and transplanting of rare species) likely to be either successful or perhaps even ecologically sound practice. Nor does the Panel anticipate, given the natural harshness of the alpine climate and short growing season, that natural succession patterns can be re–established within the area within decades or perhaps even centuries. As a result, the Panel believes impacts within this area cannot be mitigated and will be significant.

The third area of particular concern to the Panel is the protection of the Cardinal Divide Natural Area. The Panel notes that this area is in fact a valuable resource to CRC, since it provides a refugia for a number of native plant species which will likely eventually become important elements of a truly successful reclamation program. The Panel does believe that the Cheviot Coal Project can be carried out in a manner which also ensures that the ecological integrity of the Cardinal Divide is preserved, but does believe that care will need to be taken to ensure this occurs. To that end, the Panel will expect CRC to:

(1) maintain a minimum 1000 m buffer between mine development and the Natural Area;
(2) ensure that its reclamation programs do not have a negative impact on existing plant communities in the Cardinal Divide Natural Area;

(3) ensure that mine development does not create new access points, particularly for vehicular traffic, into the Natural Area; and

(4) work closely with the Alpine Club Coalition to continue to map and identify rare plant species, and in the design of its revegetation programs, particularly the selection of and sources for potential reclamation species.

With regard to follow–up and monitoring programs, the Panel notes that AEP has direct regulatory responsibility for reclamation programs at the Cheviot Coal Project. Other than for the suggestions already contained in this report, the Panel believes the experts in AEP are best placed to design any additional needed programs.

4.2 Soils and Terrain

4.2.1 Views of the Applicant

Study Area

CRC stated that its studies of soils and terrain for the Cheviot Coal Project were carried out at several levels of detail. A regional assessment scale (1:50 000) was used to map general features over a 400 km^2 area extending from Highway 40 in the north, to the boundary with Jasper National Park to the west, to the Cardinal River valley in the south, and to the confluence of Red Cap Creek and the Cardinal River to the east. More detailed mapping of the mine site and of potential corridors along both the McLeod River and MacKenzie Creek was also carried out.

Existing Conditions

CRC stated that soil landscapes (i.e. the spatial distribution of soil types) within the study area varied considerably. Within the surface mine itself, forest soils dominated the lower elevation subalpine ecoregions and extended into some of the higher elevation areas as well. These soils generally had an upper duff layer; acidic, nutrient deficient, and carbon poor upper soils; and acidic lower soils. In subalpine areas with shrub cover, soils were covered with sod rather than duff, with extensive organic carbon build up in the A horizon. The open forest covered areas of the subalpine generally had either eutric or dystric brunisol soil profiles.

Within the valleys, patterns of wet mineral soils and peat soils, often covered with accumulations of wind deposited sediments, were common. CRC also noted that soil landscapes were strongly influenced by slope aspect. South and south–west facing soils on steep slopes were similar to prairie soils, while soils on north–east exposures were typically frozen until August or even permanently frozen. Soils in the alpine areas were particularly complex.

With regard to the coal processing plant, CRC described the soils there as a mosaic of dry, moist,

and wet shrub/grassland and forest soils. Small patches were frozen for much of the year. Along the transportation and utilities corridor, the terrain is dominated by the river flood plain and steep valley walls. Soils are primarily regosols and brunisols, quite thin, and have high quantities of gravel and rock. Almost 36 per cent of lands in this area (39 ha) were classified as previously disturbed by various human activities.

In addition to soil conditions, CRC inventoried terrain features perceived as important due to their rarity, diversity, educational value, or scenic quality. Special terrain features in the region were felt to include the Cadomin Caves, cirque moraines, rock glaciers, landslides and massive slope failures, a talus chute, a glacially scoured valley, the McLeod River canyon, scenic viewpoints, several unique soil landscapes, and possible glacial refugia.

A total of eight scenic viewpoints (i.e. areas of unobstructed view, usually in several directions) were identified. CRC noted that all are accessed by trails and are popular destinations. Unique soils in the area included solifluction soils (i.e. downslope soil movement of saturated soils over a frozen subsurface layer), which were found on a north–west facing slope of Cardinal Divide, permafrost soils (i.e. soils frozen through the summer) which were found in several localized areas, and fragipan soils (i.e. easily fractured soils with a hard layer in the subsoil which prevents downward migration of water) which have not been reported elsewhere in Alberta and were located in two relatively extensive areas to the north and east of the mine permit boundary.

With regard to whether the Cheviot area contained glacial refugia, CRC stated that, based on its considerable field research, it was clear that much, if not all, of the mine permit area had been glaciated during the last ice age. CRC noted that several small refugia could exist within the region but likely outside the mine permit area. However, even if such refugia did exist, CRC was of the view that the landscape had sufficiently changed in response to natural successional patterns that the ecological values which make such areas important likely no longer existed

Expected Effects

CRC described a number of impacts from mining, plant site development, and road/rail/power line construction on soils and terrain features. CRC identified eight VECs that it felt could be at risk from the development of the Cheviot Coal Project. These were: soil resources; land capability and productivity; scenic viewpoint trails; permafrost, solifluction, and fragipan soils; the McLeod River canyon; and non–glaciated lands.

During mining, CRC noted that there would be a complete disruption of the natural soil landscapes (approximately 2800 ha). Associated with that would be the loss of non–salvageable soils, accelerated soil erosion, and the loss of soil diversity, as well as a possible positive increase in soil quality due to mixing. CRC observed that poorly conducted mining and associated soil salvage operations could result in either the delay in returning to or permanently reduced land capability and future production. Similar impact on soils within the proposed plant site (approximately 108 ha) and the McLeod River valley (approximately 116 ha) were also predicted.

Impacts on unique terrain features were also considered to be possible. These included the loss

of scenic viewpoints and access trails; and the destruction of permafrost, solifluction, and fragipan soils at both the mine site and the coal processing plant. Within the transportation and utilities corridor, disturbance of the McLeod River canyon was also noted as a potential risk to a unique terrain feature.

With regard to mitigation of these impacts on soils, CRC stated that a successful reclamation program was the primary approach available to deal with impacts on terrain features, soils, watersheds, and land productivity. CRC provided a summary of its proposed reclamation program for the Cheviot Coal Project. Prior to construction, all merchantable timber will be removed and brush cleared where feasible, and non–salvageable woody debris will be incorporated in to salvaged topsoil or windrowed. CRC stated that topsoil salvage will be carried out wherever feasible. If possible, salvaged topsoil will be immediately replaced on to reclaimed areas and, if not, stockpiled within the mine disturbance limits. Subsoil (regolith) will also be salvaged in volumes necessary for reclamation.

CRC noted that it will recontour the areas disturbed by mining. This will include reducing all dump slopes to an angle less than 27° and backfilling of pits, highwalls, and footwalls where possible. Through "designed dumping" in the final stages, a complex of concave and convex surfaces will also be created. CRC proposed, as is currently the case at the Luscar mine, to cover all resloped lands with at least 10 cm of regolith, unless overburden characteristics are such that this is not required. CRC stated that 70 per cent of the area disturbed by mining will receive an additional 30 cm of topsoil. Finally, revegetation will be initiated, first using grasses and legumes for watershed protection and soil conditioning. Tree and shrub planting will be undertaken two to four years after initial revegetation.

Once reclamation in an area was successfully underway, CRC noted that it was prepared to re–establish viewpoints and access trails, presumably under the Coal Branch Access Management Plan, and anticipated limited access within 5 to 15 years to reclaimed years. Impacts on unique soils could, CRC stated, be minimized by avoidance (e.g. solifluction soils and fragipan soils) or routine handling procedures (e.g. permafrost soils). CRC predicted a net positive impact on terrain features within the McLeod River corridor from the Cheviot Coal Project, due to the reclamation of previously disturbed areas. No impacts on glacial refugia were predicted.

CRC noted that the region contained other mine developments and, as a result, there would be a regional cumulative impact on soils and terrain. CRC stated that, given the extent of these landforms in Alberta, no significant cumulative effect was predicted.

4.2.2 Views of the Interveners

The AWA noted several concerns with CRC's prediction of impacts on soils and terrain features. In their view, CRC had not adequately addressed the impact of mine development and associated landscape changes on regional aesthetics for either Jasper National Park or the Cardinal Divide Natural Area. In their view, the Cheviot mine would have a serous impact on the wilderness values of both areas. They noted that the proposed open pit mine, 22 km in length, would directly and indirectly affect many of the features which gave the areas their high scenic value.

The AWA Coalition noted that topsoil replacement is only intended for 70 per cent of the reclaimed area. This, they stated, was inconsistent with government reclamation policy of re–establishing equivalent land capability. The AWA Coalition believed that provision should have been made for 100 per cent replacement of topsoil, particularly since this would promote the growth of shrubs and trees. They also believed that the direct placement of topsoil onto reclaimed areas should have been given priority in CRC's engineering of its conceptual mine plan.

Furthermore, the AWA Coalition argued that the creation of a "man–made" landscape (i.e. "changes from a ridged and rolling topography to a terraced landscape of highwall and footwall cliffs and headwater stream valleys filled with rock rubble") significantly different from the present natural landscape was also inconsistent with reclamation policy. At the hearing, both the AWA Coalition and the WCWC argued that much of the area was non–glaciated and so mine development would result in the loss of particularly unique soil and terrain conditions and the associated flora and fauna.

The AWA Coalition stated that CRC's reclamation plan had a number of deficiencies, including failure to address:

- the moisture deficit associated with alpine and subalpine environments;
- snow deposition patterns;
- reclamation of vegetation to pre–disturbance structural levels (i.e. forest, shrubland, etc); and
- monitoring programs.

They also stated that CRC had not provided sufficient detail to be able to assess its commitment to reclamation, nor had the company truly committed to any specific mitigation programs.

AEP expressed a significant concern with CRC's proposal to reclaim disturbed areas without topsoil. AEP stated that CRC's proposed reclamation plan would, in its view, result in the wasting of at least 2 000 000 m^3 of available topsoil. AEP did not believe that CRC had provided sufficient evidence to justify this approach. AEP stated that while site specific waivers of its requirements to conserve topsoil would be considered, any acceptable reclamation plan for the Cheviot Coal Project would be based on the conservation of salvageable topsoil.

CEPA echoed the concerns raised by AEP and stated that, in its view, all recoverable topsoil must be salvaged and a 30 cm cover provided to areas of grassland (580 ha) now being proposed to only be covered by regolith.

4.2.3 Views of the Panel

The Panel has examined the evidence provided by CRC and believes that the company has adequately described existing soil conditions and terrain features.

With regard to impacts on soils and terrain, the Panel accepts that both existing soil landscapes and terrain features will be heavily disrupted by all aspects of the Cheviot Coal Project development. Furthermore, there appears to be no practical method available for CRC to return either back to their original configurations. If the mine is approved, existing soils will be mixed and redistributed, and virtually all existing terrain features will be changed, some extensively. Therefore, the Panel believes that impacts to soil landscapes and terrain features in general will be significant.

Given CRC's experience at the Luscar mine, the Panel accepts that the re–establishment of the productive capacity of reclaimed soils at Cheviot, with careful management, can be achieved. Provided that AEP's concerns regarding soil salvage are addressed in the final reclamation plan, the Panel also believes that impacts to soil quality and productive capability will not be significant. The Panel also believes that CRC can create microtopographic features able to make the reclaimed landscape appear more "natural", as well as enhance the survival of woody plant species. The Panel is also prepared to accept that impacts to the area's unique soil features can in general be avoided since, with the exception of permafrost areas, most appear to be located beyond the likely mine disturbance boundaries.

The Panel is not convinced the Cheviot Coal Project will significantly affect the wilderness experience within Jasper National Park. However, the changes to terrain features will have an impact on aesthetics and therefore very likely on the wilderness experience, perhaps permanently, for at least some visitors to the Cardinal Divide Natural Area.

The Panel accepts CRC's undertakings to re–establish viewpoints as reasonable. The Panel does note that CRC's success in this area does appear to require that at least to some degree that the Coal Branch Access Management Plan be implemented, and would urge AEP to take any steps necessary. The Panel is also prepared to accept CRC's view that within the proposed mine permit area the risk of disturbing glacial refugia is not significant. The Panel also accepts that CRC's activities within the McLeod River valley are unlikely to result in a significant adverse effect on soils and terrain.

The Panel believes that ongoing monitoring of the success of CRC's reclamation programs is clearly necessary. However, as noted in Section 4.1.3, the Panel also believes that these programs should be designed by AEP as part of its approval function.

4.3 Carnivores

4.3.1 Views of the Applicant

CRC noted that carnivores, especially the larger–bodied ones, can be considered both as indicator and as umbrella species for impact assessment purposes. An indicator species in this context is a species that is particularly sensitive to the effects of development and human activities. Measurements of the effects of development on such species provides a measure of the success of impact mitigation programs. For umbrella species, the presence of declines in population and habitat for such species are taken to indicate not only stresses on the species itself, but also on

other species and on the ecosystem to which they belong. Protection of the umbrella species, on the other hand, will generally result in the preservation of adequate ecological conditions for other species. The primary focus of the impact assessment was on two carnivores, grizzly bears and wolves, that are considered to be both indicator and umbrella species.

Study Area

Reflecting the large, but ecologically specific spatial needs of the grizzly bears and wolves, two different but largely overlapping regional study areas were defined. The study areas centred on the Cheviot Coal Project area, but included 878 km^2 of nearby Jasper National Park. Each study area covered about 3000 km^2. The study's focal species have large home range sizes, and the large study area size was considered necessary by CRC in order to adequately assess the impacts of development on these species.

Existing Conditions

CRC noted three conditions that need to be present in order to have complete ecological integrity in a region. These are: (1) all indigenous species are present; (2) all species' numbers approximate historical levels; and (3) the ecosystem is still shaped by natural processes such as wildfire. With regard to the first condition, CRC noted that 16 species of mammalian carnivores are present or are assumed to be present in and nearby the proposed Cheviot Coal Project. CRC indicated that none of the carnivore species are known to have become extirpated; however, two of the species, grizzly bear and wolverine, are listed as vulnerable by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

With regard to the second condition, six species (grizzly bear, bobcat, cougar, lynx, river otter, and wolverine) are considered, at a provincial level, to be at risk, and CRC observed that it was likely that several mammalian carnivore populations in the region had been depleted below historical levels. Four species (coyotes, marten, red fox, and wolf) all appeared, based on trapping records, to have actually increased in numbers over the last two decades. Coyotes and red foxes were noted by CRC to adapt well to human disturbance, while wolves appeared to have increased from a population low induced by predator control programs in the 1950s, despite a significant decrease in regional habitat effectiveness for wolves during the same period.

CRC noted that the third condition of ecological integrity (i.e. the action of natural processes) was also not met in the region. Wildfire, CRC observed, is suppressed and numerous other activities, including forestry, oil and gas development, and motorized recreation had served to fragment habitat and produced a wide range of disturbances to regional carnivore populations. CRC suggested that this could result in significant declines in populations of species such as grizzly bears, wolverines, and fishers which do not do well in fragmented habitat.

In order to describe existing conditions for carnivores, as well as to predict the potential effects of the development of the Cheviot Coal Project, CRC undertook to develop Cumulative Effects Models (CEMs) for the two selected indicator species. For grizzly bears, a model originally developed in Yellowstone Park was selected and modified using local parameters.

The main output product for the grizzly bear CEM was a description of the current status of "habitat quality" and "habitat effectiveness" for the region and for the Cheviot Coal Project area. CRC observed that habitat quality is a measure of the inherent suitability of an area for a species, while habitat effectiveness is a measure of an area's potential usefulness to a species, after factoring in the negative influences of human development and activities. Therefore, it is quite possible for an area to have high habitat quality but still support very few animals due to low habitat effectiveness. The CEM was also used to help predict the effects that implementation of the Cheviot Coal Project would have on grizzly bear habitat quality and habitat effectiveness, both locally and regionally.

For the grizzly bear CEM, the regional study area was divided by CRC into three Bear Management Units (BMU). Each of the three BMUs were further subdivided into several Bear Management Sub-Units (BMSU). The average size of each BMSU (338 km^2) was roughly equal to the size of a female grizzly bear's home range in this part of the Rocky Mountains. This scheme of subdivision allowed existing habitat and the effects of development to be assessed on a biologically meaningful scale.

BMU 1, located entirely within Jasper National Park, showed the lowest quality habitat for grizzly bears in the entire study area due in part to a large proportion of mountainous terrain. Habitat effectiveness, however, was very high, averaging 95 per cent, due to few human developments or activities in this portion of the study area.

BMU 2 was located east of, and adjacent to, Jasper National Park and included the entire surface portion of the proposed Cheviot mine within BMSUs 2A and 2B. The inherent habitat quality in BMU 2 was moderate to high, depending upon the season. Current habitat effectiveness values for BMSUs 2A and 2B averaged 68 per cent. CRC stated that this value is slightly below the 70-80 per cent effectiveness threshold assumed to be needed for regular versus occasional use by grizzly bears.

BMU 3 is the north–east portion of the study area and generally east of the mine permit boundary. This unit includes the proposed transportation and utilities corridor for the Cheviot Coal Project, the existing Luscar mine, a concentration of timber harvesting activities, the Hamlets of Cadomin and Mercoal, and a relatively extensive network of high and low speed roads, as well as logging, seismic, and other exploration roads. Although habitat quality was higher in this area for grizzly bears than other portions of the study area, the habitat effectiveness for grizzly bears, due to the cumulative effects of extensive development, was so low (averaging 44 per cent), that only occasional use of this area by grizzly bears was predicted.

Because an existing CEM was not available for gray wolves, an original model was constructed, using available biological information on wolves, their prey (ungulates), and disturbance features from the grizzly bear CEM. The results of the wolf CEM showed many parallels to that of the grizzly bear CEM. The wolf CEM showed that human development and activities have adversely affected habitat effectiveness in the regional study area outside of Jasper National Park. Seventy-three percent of high quality wolf habitat has been degraded to medium or low quality. Wolf populations in the local area of the proposed Cheviot Coal Project are already stressed, largely because of decreased habitat effectiveness. Road densities already exceed or approach

known tolerance levels for wolves. Consequently, CRC believed that the area proposed for the mine is currently of low attraction to, and therefore limited importance for, wolves.

Expected Effects

CRC analyzed potential impacts of the Cheviot Coal Project on mammals from a general perspective, using the CEM models for the two indicator species, grizzly bears and gray wolves. As well, more specific assessments of the effects of the project components on various species were carried out.

With regard to the three BMUs, CRC believed that with respect to BMU 1, which was located in Jasper National Park, that the Cheviot Coal Project would not effect either habitat quality or habitat effectiveness. For BMU 2, east of but adjacent to Jasper National Park, with the addition of disturbance due to the proposed Cheviot Project, habitat effectiveness values would drop to an average of 49 per cent, well below the assumed threshold values of 70–80 per cent. At that point, CRC predicted only occasional use of BMSUs 2A and 2B by grizzly bears. The proposed mine was therefore predicted to have an immediate, significant, adverse effect on the grizzly bears that currently include this specific area within their home ranges.

CRC noted that implementation of the Cheviot Coal Project in BMU 2 would also create significant potential for the interruption of grizzly bear movements. This potential interruption of movement would occur primarily because of the shape, size and location of the mine footprint itself, and also because of the associated human activities (blasting, traffic, etc). Fragmentation of grizzly bear habitat and populations beyond the area actually directly disturbed by the surface mine would be the likely outcome. Mitigation of these impacts through changes to the mine plans was not considered to be feasible.

For BMU 3, located to the north–east of the Cheviot mine, CRC noted that this BMU would be directly affected by development of the road, railway, and powerline. CRC stated that while only a small portion of the habitat would be disturbed, and overall habitat effectiveness in BMU 3 would not be further degraded by the Cheviot Coal Project, the affected habitat was primarily valley bottom, which had very good inherent habitat quality. Also, the upgraded access road could further interrupt grizzly bear movement and so further fragment grizzly bear habitat and populations.

With regard to wolves, CRC noted that the surface mine would degrade 116 ha of high quality wolf habitat to medium quality and 2023 ha of medium quality habitat to low quality, making most of the project area unavailable to wolves. Mitigation was expected to be difficult, and would consist primarily of dispersing human activity spatially and temporally, as much as possible, across the project area.

A number of other project specific impacts were also considered by CRC. One source of impacts was mortalities resulting from collisions with vehicles, particularly in the McLeod River valley, which is very narrow and a natural travel corridor for wildlife. The road (proposed speed limit of 90 km/hr) was seen as a major risk of mortality while the rail line (30 km/hr) was not, provided the speed limit was observed. The use of a high bridge at Whitehorse Creek was predicted to reduce these impacts somewhat, and other possible mitigation suggested included the use of

speed limits at areas where crossing of the road by wildlife was common, and fencing.

Increased hunting, trapping, and poaching due to increased access was also seen by CRC as a source of direct mortality for carnivores. Mitigation could be achieved by restricting access in general, the means of access (e.g. motorized vehicles) in particular, or by changing hunting and trapping regulations. The need to control "problem" wildlife, due to increased human interaction, was also seen as a long–term risk of impact, although CRC believed that this could be controlled through proactive management.

Cumulative Effects

The CEM used by CRC also considered the regional effects of the Cheviot Coal Project when combined with other existing and proposed developments within the study area (i.e. cumulative effects). CRC emphasized that it was important to realize that the adverse effects of the Cheviot Coal Project would be part of a regional series of cumulative effects, all of which are already stressing sensitive carnivores. These other sources of cumulative effects included oil and gas activities, quarrying activities, recreational activities, and other mining activities, although some pockets of more secure habitat have been created through access and development control (e.g. designated protected areas).

Overall, the projected regional changes in human developments and activities were predicted to significantly further erode the status of carnivores from an already apparently declining condition, particularly for the more sensitive of the large carnivores species. CRC stated that the long–term persistence of populations of grizzly bears, wolves, cougars, wolverines, and fishers, due to ongoing development and activity in the region, was predicted to be threatened within the entire non-national park portion of the study area, and not just the proposed Cheviot mine site. It was felt unlikely that grizzly bears, wolves, or wolverines would be extirpated from the Jasper National Park portion of the grizzly bear regional study area. However, any individuals dispersing into the provincial portion of the study area likely already experience increased mortality risk. If current development trends continued in the region without incorporating the needs of these sensitive large carnivores, then CRC believed that provincial lands would become an even greater mortality sink for carnivores originating from Jasper National Park. Compromising large carnivore populations to this extent would not, in CRC's view, be consistent with regional wildlife management objectives.

Mitigation Opportunities

In their application CRC recognized that the proposed Cheviot Coal Project, along with other regional developments, would have an adverse effect on carnivores. However, CRC also noted that, even without implementation of the Cheviot Coal Project, the currently declining status of the populations and habitats, particularly for large carnivores, is an early indication of the loss of biological diversity in the region.

The mitigation scenarios for carnivores reviewed by CRC included avoidance of disturbance, minimization of disturbance, and compensation for disturbance. Given the scope of the project it was determined that the first two would be difficult, if not impossible to accomplish. CRC stated

that the most effective method to address the predicted impacts to carnivores would be to establish a carnivore compensation program. Such a program would be designed to address the needs of carnivores at the regional scale. CRC proposed that, given project approval, it would compensate for unmitigatable losses to carnivore habitat by creation of a "Cheviot Mine Wildlife Compensation Program". In its application CRC committed to: (1) contributing to funding regional research on carnivore ecology; (2) contributing towards establishing and supporting a Wildlife Management Board (or similar body); and (3) contributing toward regional level education packages aimed at informing the public regarding the various carnivores. CRC noted that a number of similar programs were now underway in both Alberta and other parts of North America.

At the hearing, CRC stated that, in its view, compensation, to be effective, must be applied on a regional basis with a multi–stakeholder involvement. The following highlights the suggested goals of CRC's proposed carnivore compensation program:

Goal 1. To form a Carnivore Compensation Advisory Board and to define its responsibilities and reporting lines.

Goal 2. To require this advisory board to prepare within one year a carnivore management action plan to address stresses on sensitive carnivores within the Cheviot Coal Project cumulative effects areas. As part of this plan, specific criteria for success will be developed. Success criteria would include species specific distribution, population, mortality, habitat, connectivity, and other relevant parameters. Grizzly bears, wolves, and possibly wolverines were recommended as focal species on which to gather research data to test management hypotheses.

Goal 3. To use research in an adaptive management context to test, and validate or revise, the criteria for success. The Carnivore Compensation Advisory Board would continue until the criteria for success are met, and mechanisms are in place to monitor and maintain that criteria.

The suggested objectives of the carnivore compensation program were to:

(1) monitor and understand sensitive ecosystem elements to facilitate management decisions affecting carnivores;

(2) monitor and understand human uses and changes to the land base to facilitate management decisions affecting carnivores;

(3) develop land management options for carnivores and their ecosystems;

(4) develop education and outreach programs regarding carnivores and their supporting ecosystems;

(5) monitor people's knowledge, attitudes, opinions, actions, and values regarding carnivores and supporting ecosystems;

(6) implement a baseline study of the historic ecology of carnivores and their ecosystems in the region; and
(7) establish an organizational structure for the program.

A tentative administrative structure for the carnivore compensation program was also suggested by CRC. It included representation from provincial and federal government, CRC, and other industrial operators, and should include consultation with other interested stakeholders. Management program implementation would be addressed through a multi–level committee structure with management authority remaining with agencies currently having those responsibilities.

CRC stated that the impacts of the proposed development on carnivores, after considering mitigative measures and the proposed compensation program, would be, in its view, considered to be insignificant.

4.3.2 Views of the Interveners

The AWA Coalition stated that, in its view, CRC's evidence confirmed that the best option for carnivores in the region was implementation of a conservation strategy in the region while at the same time denying the Cheviot Coal Project. If the mine were approved, the AWA Coalition indicated that the proposed compensation program should not be seen as an acceptable mitigative measure because: (1) the evidence provided did not show that there is commitment to the compensation program by all stakeholders; (2) even CRC had not made a full commitment to the program; (3) while the program intended for the carnivores to be accommodated outside the Cheviot Coal Project, there is no habitat of comparable quality elsewhere; (4) there was no legal mandate attached to the program; and (5) the lack of experience with such complex collaborative projects made it difficult to predict the chances of success.

The AWA Coalition submitted that it was particularly concerned about the fragmentation of habitat for all wildlife species which would occur should the application be approved. It was their belief that fragmentation will result in the proposed mine area becoming a filter to species, making it more difficult for them to access and therefore make use of the region. Fragmentation would also reduce the biological diversity in the area. The AWA Coalition also noted Parks Canada's comments with respect to the essential nature of ecological linkages in order to sustain viable wildlife populations and therefore sustain the ecological integrity of Jasper National Park. The AWA Coalition stated that the proposed mine would clearly sever those linkages thus having a devastating impact on biodiversity both within and outside of the park.

The AWA Coalition submitted that substantial evidence was presented showing that wildlife corridors are required across the proposed mine, and further noted that sufficient evidence was provided stating that the appropriate location and design of these corridors is still unknown. Given that the Cheviot coal leases are designated under the Coal Branch Subregional Integrated Resource Plan as critical wildlife habitat, it was their view that more work must be carried out prior to designating specific corridors in order to ensure that they meet the needs of the various affected species. Therefore, the approval of the Cheviot Coal Project was, in their view, premature.

RMEC also stated that there were a number of problems with CRC's proposed Carnivore Compensation Program. RMEC noted that there was no basis upon which to evaluate the program and that all of the other examples of compensation programs provided by CRC involved situations where problems were detected after the fact and that compensation was implemented to account for past "blunders". RMEC stated that the Cheviot Coal Project is still at a conceptual phase and therefore the comparisons which were presented by CRC were not valid.

Another concern of RMEC regarding the compensation program was that there were many areas in Alberta's eastern slopes where grizzly bear habitat has already been lost or is currently being damaged. Given this, and CRC's projected 100 year+ reclamation period, RMEC stated they were concerned that there may no longer be a source of grizzly bears to repopulate the area even if restoration of both habitat quality and effectiveness could be accomplished.

RMEC also indicated that, should the proposed application be approved and the carnivore compensation program be implemented, there will be a significant imposition of constraints on other activities in other areas of the east slopes. This would result in costs being transferred to other companies and members of the public. RMEC noted that, in their view, this fact was not addressed in the draft compensation package even though it is a significant public interest consideration.

It was stated by RMEC that the draft compensation program was a notion concocted by CRC to address unmitigatable impacts to carnivores out to 100 years. RMEC felt that CRC's plans for implementation were vague, without commitment from CRC, and dependent upon participation from a whole range of agencies and groups, all with varying objectives, mandates and legislation.

Further, RMEC stated that even CRC's witnesses had conceded that the compensation plan had an extremely low probability of success.

Regarding the cumulative effects assessment presented by CRC, RMEC felt that it was scientifically flawed and certain aspects of the evidence were presented in such a manner that the ability for appropriate cross examination did not exist. Given this, RMEC stated that information on the cumulative effects assessment should not be considered by the Panel. Further, RMEC stated that CRC's view on significance was very narrow and legalistic.

Both RMEC and the Alpine Club Coalition supported the AWA Coalition's concerns with respect to wildlife corridors. RMEC indicated that corridors could be an option; however, CRC had presented no evidence that supported a conclusion as to the effects of wildlife corridors. The Alpine Club Coalition noted that, to be effective, such corridors must also be closed to off highway vehicle traffic.

In its intervention, AEP stated that it has no objection to the application with regard to carnivores, subject to the Panel finding that the proposal is in the public interest, but that it did have a number of recommendations that it believed the Panel should address in its decision. AEP stated that it believed that CRC should be required, in consultation with AEP, to carry out further ongoing scientific monitoring of wildlife movements across the proposed mine site in

order, in part, to establish the need for a permanent corridor or corridors. Should a need be shown, AEP requested that the Panel require that the placement and design of any resulting corridor(s) also be done in consultation with AEP. AEP also recommended that the Panel require CRC to act as a catalyst in generating multi-stakeholder support for the implementation of the carnivore compensation plan and that CRC be required to contribute to a fund for the purposes of carnivore habitat mitigation.

At the hearing, AEP noted that it did have concerns regarding wildlife mortality within the access corridor and strongly suggested that speed reduction was likely the major mitigative tool.

Parks Canada stated that while it had no mandate on provincial lands, it did have a legislated mandate to protect the ecological integrity of Jasper National Park, which included its involvement with projects occurring outside of national parks if they had the potential to impact the park's ecological integrity. Parks Canada further noted that Jasper National Park shares many VECs with the project area, and the broader regional ecosystem had been referred to extensively in the EIA. In its view, the Cheviot Coal Project, as proposed, clearly has the potential to adversely impact the ecological integrity of Jasper National Park. In particular, Parks Canada noted that the EIA had established that significant effects on grizzly bears within the regional ecosystem, which includes portions of Jasper National Park, were possible.

Parks Canada noted that the development proposal by CRC represented a unique opportunity for the creation of a regional ecosystem management authority and Parks Canada concurred that this was desirable. Such an authority could, in the view of Parks Canada, oversee the establishment of landscape level goals within the regional ecosystem and the development of strategies to attain these goals. By outlining a development plan covering the next 20–25 years (the forecasted period of mine disturbance), Parks Canada believed that the applicant had also set the groundwork for assessing the potential cumulative effects of the project. The tools developed by CRC in the EIA (e.g. the CEMs) also provided, in its view, an excellent starting point from which to address cumulative effects of past, existing, planned, and proposed future developments.

Parks Canada offered several recommendations which it believed would help to alleviate its concerns. The recommendations fell into two categories; that is, recommendations which should be implemented by CRC as part of the approval process, and recommendations which should be incorporated into follow-up programs should the project be approved. Parks Canada suggested that:

(1) A "core area" analysis for BMUs 1–3 should be conducted and the results combined with the cumulative effects area analysis for an overall assessment of habitat capability and security.

(2) The cumulative effects/core area assessment should be expanded to include other planned or foreseeable human activities (e.g. timber harvesting, mineral and oil and gas exploration and development, recreation, etc) in the larger analysis area (i.e. BMUs 1–3). The cumulative effects of at least one likely scenario should be assessed with such additional activities at five–year intervals over the next 20 years.

(3) All habitat lost due to the proposed Cheviot Coal Project should eventually be compensated in–kind elsewhere in the same BMU in accordance with applicable provincial and federal policies regarding "no net loss".

(4) On-site mitigation, such as the delineation of a "landscape linkage" to facilitate movements of grizzly bears east/west and north/south across the Cheviot Coal Project and the cumulative effects analysis area, should be developed.

(5) On-site mitigation should be developed for the major transportation corridors to reduce the potential for wildlife mortality due to vehicle and/or train collisions.

(6) A "Road Corridor Wildlife Sanctuary" along the Grave Flats Road from the Cardinal River–Brazeau River junction over the Cardinal River Divide and down along the McLeod River to Mercoal should be established to reduce human caused mortality (legal and illegal) of large carnivores.

(7) A moratorium on legal hunting of grizzly bears in all or a significant portion of Grizzly Bear Management Area (GBMA) 4B following any year in which the Total Known Man-Caused Mortality (TKMM), including removals, exceeds two bears or, alternatively, a moratorium on legal hunting of grizzly bears in all or a significant portion of GBMA 4B should be established.

(8) Solid waste management strategies for making human food and garbage unavailable to bears to reduce the potential for the need for destruction of habituated bears should be developed and implemented.

(9) CRC should be required to work with Jasper National Park to further identify and mitigate access concerns.

(10) Regional ecosystem goals (i.e. landscape level goals) should be established at the appropriate scale to allow Parks Canada to meet its objectives for the maintenance of ecological integrity and targets for such things as habitat connectivity and landscape linkages, habitat effectiveness, and potential threshold values for grizzly bears.

(11) A regional management authority which is both multi–disciplinary and multi–jurisdictional should be created to oversee the development and implementation of strategies to meet landscape level goals for the regional ecosystem.

(12) An inter–agency science advisory group, reporting to the regional management authority, should be created to address various conservation issues for grizzly bears and other carnivores in the regional ecosystem. The group should establish goals and objectives for habitat capability and security, ceiling levels of total known man-caused mortality (including net removals), and landscape linkages based upon best scientific information available on grizzly bears. Conservation actions for grizzly bears should be enacted and evaluated independently in an adaptive management approach for prudent stewardship of

natural resources.

(13) All development proposals within the region, including the proposed Cheviot Coal Project, should be reviewed on the basis of cumulative effects.

(14) The long–term protection of critical habitat and the integrity of corridors that connect critical habitats should be ensured in order to prevent isolation of habitat or wildlife species beyond development boundaries.

(15) The Coal Branch Access Management Plan should be revised and implemented with emphasis on ecological goals, not historical use patterns.

(16) If approved, implementation of the Cheviot Coal Project should follow an adaptive management framework incorporating a rigorous program of monitoring key ecosystem components and feedback into ongoing mine operation and development. This would be accompanied by a commitment by CRC to alter operations when unanticipated threats to ecological integrity are identified.

In its submission, the Alexis First Nation highlighted potential impacts on wildlife habitat and movement as well as regional land access. They also requested that the Panel order the participation of both the governments of Alberta and Canada in regional wildlife management and planning initiatives and establish a mechanism by which the EUB could monitor the decisions and impacts of the planning process.

4.3.3 Views of the Panel

In assessing the potential effects of the Cheviot Coal Project on mammalian carnivores, the Panel is convinced, from the evidence provided by all parties to the hearing, that a regional perspective must be taken. The Panel notes that there appeared to be general acceptance by all the parties with regard to CRC's contentions that many carnivore populations within the region have already been negatively affected by a range of man–induced factors and that, with or without approval of the Cheviot Coal Project, there is a reasonable likelihood that these impacts will continue. It is within this general context that the Panel believes that it should consider CRC's application.

While CRC has considered some site–specific aspects of the impacts of its proposed mining operations on carnivores (e.g. direct mortality from vehicles on the access road), the bulk of their work has been directed towards looking at regional habitat effects through the use of CEMs. The Panel agrees with this approach and notes the support expressed by Parks Canada. The Panel is also prepared to accept as reasonable CRC's focus on grizzly bears and gray wolves as indicator species of the general quality of regional habitat for mammalian carnivores.

With regard to Jasper National Park, the Panel is prepared to accept that development of the Cheviot Coal Project will not result in the direct loss of either habitat effectiveness or habitat quality for mammalian carnivore populations in general or grizzly bears in particular within BMU 1. The Panel does believe that development will create barriers to the movements of carnivores such as grizzly bears, wolverines, and wolves between the park and provincial lands (BMUs 2 and 3). These barriers will occur primarily due to the relative sensitivity of such

species to human activities, and the reduction in cover or escape habitat as the mine develops. By altering the natural movements of these species, many of which tend to be territorial and widely dispersed, it can be anticipated that at least some redistribution of home ranges will occur, and possibly the eventual loss of some animals which currently move between provincial land and the park. For grizzly bears, given that habitat quality is relatively lower within the park than it is beyond the park, these effects may be significant. Perhaps more importantly, the areas outside of the park may also become even more of a mortality sink than currently occurs. Therefore, while habitat quality within Jasper National Park will not be directly affected by the Cheviot Coal Project, the Panel does accept that some impacts on carnivores which make use of the Park likely will occur.

With regard to BMU 2, the area most directly affected by mine development, the Panel accepts that, based on available data, the area is currently able to sustain intermittent to regular use by grizzly bears, and therefore presumably most of the other mammalian carnivores. The Cheviot Coal Project will result in a significant loss of carnivore habitat, including grizzly bear habitat from the moment construction begins until some period well after mining has ended. While movement barriers (e.g. Grave Flats Road) currently exist, the Panel believes that the development of both the surface mine and the upgraded access road will create significant new barriers to movement over at least the life of the mine. The Panel believes that these barriers will further increase as mine development extends to both the east and west from the Harris Creek and Cheviot Creek drainages. These barriers, plus the loss of cover, the loss of prey animals, the fragmentation of habitat, and ongoing human activity will all significantly reduce the value of the mine site as well as surrounding areas for wildlife for the life of the mine at an absolute minimum, and likely for several years or decades later. The Panel is also of the view that the ultimate value of the Cheviot mine site to carnivores will be at least partially a product of CRC's ability to re–establish appropriate vegetative cover within a reasonable period of time. What that time period is or should be is as yet, also unknown.

Based on the evidence provided at the hearing, the Panel was unable to predict the spatial extent of these impacts on carnivores beyond the general mine permit area. Clearly, this will be a product of several factors, including the biological requirements of the various species and their sensitivity to disturbance. For example, the Panel notes that BMU 3, while it contains relatively high quality habitat for grizzly bears had, due to current levels of human disturbance, such low habitat effectiveness that it was of very little real value to grizzly bears. BMU 1, on the other hand, had little disturbance but also very little high quality habitat. The Panel believes it is reasonable to assume that similar issues exist, particularly for the larger carnivores such as wolves, wolverines, and cougars, in all the areas surrounding the mine site.

It might be argued that, since BMU 3 as well as other smaller areas in BMU 2 currently have little or no value for carnivores, there is no incremental impact from the development of the Cheviot Coal Project. The Panel, however, does not accept this argument. For example, should other management programs be put in place (e.g. greater access control), then habitat effectiveness in the absence of the Cheviot Coal Project would presumably increase. Therefore, approval of the Cheviot Coal Project could further reduce the likelihood that other mitigation strategies will be successful.

The Panel examined the steps proposed by CRC to reduce impacts on carnivores, and provides the following comments:

(1) Mortality Due to Collision

The Panel agrees with CRC that the Grave Flats Road, if upgraded to a 90 km/hr speed limit between Cadomin and the Cheviot mine, will result in a significant increase in the chance of mortality, not only to carnivores, but ungulates, raptors, and even humans as well. The Panel would strongly suggest that CRC discuss speed limits further with regional authorities and assess whether lower speed limits over the length of the road can and/or should be imposed. While the Panel can see some limited merit in some of the alternatives listed by CRC (e.g. slowing traffic at wildlife crossing points, high bridge crossings), these all seem to be both relatively ineffective and costly when compared to a simple reduction in traffic speeds. Others, such as fencing, have significant risks to wildlife as well as benefits. Given the short distance between Cadomin and the mine (12 km), the additional travel time incurred if speeds were reduced from 90 km/hr to 50 km/hr, for example, would be in the order of 8–10 minutes or less. This does not appear to be an undue impact on either CRC, its employees, or the public.

(2) Increased Hunting, Poaching, and Trapping

If public access, and particularly motorized access, either during or following mining activities is permitted to increase, then the Panel agrees with CRC's assessment that mortality from hunting, poaching, and trapping will also increase. The Panel notes, however, that while CRC can control the amount and type of access to its lands, general changes to land access and hunting regulations are beyond both its and the Panel's jurisdiction. The Panel does expect CRC, however, to work closely with the appropriate land managers in developing access management plans, as well as general management plans for wildlife along the Graves Flat Road. Furthermore, the Panel would strongly recommend that the reduction of impacts on wildlife in general, and carnivores in particular, be a key priority in setting any new regional access plans.

(3) Possible Control Kills of Bears, Wolves, and Cougars

The Panel will expect CRC to ensure that its activities (e.g. garbage control) are carried out in a manner that minimizes the risk of interaction and habituation and the associated need for control. The Panel encourages provincial authorities to continue to take similar proactive measures at public facilities to reduce the need for such controls as much as possible.

(4) Habitat Alteration and Alienation

The Panel will expect CRC to reduce these factors to the degree possible. In particular, CRC should avoid disturbance of any areas not immediately required for mining, waste rock disposal, or roads. Where disturbance is necessary, the extent of disturbance should be minimized, particularly at the outer limits of the mine area. Reclamation on disturbed areas should be initiated as soon as possible. In particular, haul roads, especially those which provide access near to or into adjacent undisturbed habitat, once no longer needed should be closed and reclaimed as quickly as possible.

(5) Movement Corridors and Habitat Fragmentation

At the hearing there was a great deal of general discussion regarding the possibility of maintaining movement corridors across the proposed mine site. In particular, maintaining a north–south corridor along MacKenzie Creek from the Cardinal Divide Natural Area lands in the south, to the relatively undisturbed lands north of the mine, was raised by several parties. To a lesser extent, maintaining a corridor across the headwaters of Prospect Creek was also raised.

The Panel is prepared to accept CRC's view that, at present, there is only a very poor understanding of the criteria that would need to be met for such a corridor to be useful to various species. A width of 1 km, plus heavy vegetation cover, was considered likely to be a minimum requirement but this appeared to be based primarily on conjecture at this time. The Panel also agrees with CRC that the current mine plan would make creation of such a corridor difficult, and would almost certainly, if nothing else, require a certain amount of economically available coal to remain unmined.

However, the Panel does believe that, conceptually, such a corridor would be of sufficient potential benefit that further consideration is warranted. This is particularly true given the potential uncertainties associated with the success of CRC's proposed Carnivore Compensation Program (see below). Should the mine be approved, the Panel will expect CRC to revisit its proposed mine plan, particularly with regard to MacKenzie Creek and upper Prospect Creek, in order to determine whether such corridors could be accommodated and at what cost. In addition, current levels of use of these areas by wildlife must be better established, as well as an evaluation made of likely minimum widths and cover needed by the various species of importance.

Since active mining in both areas is not expected for up to a decade, the Panel believes that, should the Cheviot Coal Project be approved, adequate time exists for CRC to assess both the feasibility and benefit/cost of providing such an access corridor or corridors across the mine site. The Panel accepts that there is a reasonable probability that the development of movement corridors may be of such minimum value to wildlife that their development cannot be reasonably justified. However, the Panel does believe that further work to address the question is certainly warranted, given the potential benefits.

(6) Carnivore Compensation Program

In general, the Panel agrees that the available site specific mitigation strategies for carnivores, including corridors are, without major and costly changes to CRC's conceptual mine plan, unlikely to be successful in reducing the impacts on carnivore populations significantly. Therefore, the Panel is prepared to consider CRC's proposal to compensate for lost carnivore habitat in areas outside of the Cheviot Coal Project as a reasonable option. The Panel believes that there are now sufficient numbers of models to indicate that such a program would have at least a reasonable probability of success, despite its inherent complexities.

Therefore, should the Cheviot Coal Project be approved, the Panel will require CRC to honour its commitment to act as both a catalyst and a stakeholder in such a process. The Panel will also expect that both the companies and government agencies which advised the Panel at the hearing

that they would participate in the program, will also do so. The Panel will require CRC to report to the EUB on an annual basis regarding the status of the program. The Panel accepts that the progress of this process at first may be slow. However, the Panel also believes that it is critical that CRC be able to show measurable success in establishing the Carnivore Compensation Program before unmitigable impacts have occurred within the Cheviot mine site. Therefore, the Panel will also require that CRC be able to demonstrate either sufficient evidence of program success within three years of receiving government approval of its project or, in the absence of such evidence, what alternative steps it is prepared to take to mitigate/compensate for effects on carnivore populations. One key measure of such success will be the level of commitment by both government and industry, including financial commitment, to the regional process.

Clearly, the ultimate success of such a program will depend on active participation of a range of parties. The Panel notes from the evidence provided at the hearing that the level of proactive participation by companies in such processes tends to be directly tied to the degree that a program may affect either their present operations or future approvals. Government, on the other hand, while wishing very much to participate in a comprehensive manner, often has difficulty in identifying adequate resources. In order to assist CRC in gaining the economic as well as the moral support of other industries in the region, the Panel believes that both the EUB and AEP may need to re–examine the process by which new licences are granted to other regional industry players for developments which may also have a cumulative effect on carnivores. Such changes may be timely, given the fact that both provincial and federal environmental legislation now recognize that it is no longer adequate to examine the environmental impacts of a proposed development in isolation, but rather the cumulative effects must be considered. The Panel also believes that the government agencies will very likely need to identify the specific resources they can make available for their participation in the Carnivore Compensation Program in order for it to be effective.

Monitoring and Follow Up

A number of potential follow-up studies for carnivores were discussed at the hearing. Most of these, however, were tied to the proposed Carnivore Compensation Program. The Panel is satisfied that the need for and the extent of such studies can best be determined by the proposed Carnivore Compensation Advisory Board. At a minimum, however, the Panel does expect CRC, should it receive approval of the Cheviot Coal Project, to:

- monitor the impacts of increased traffic on the Grave Flats Road and make any adjustments necessary to reduce wildlife mortality to acceptable levels;

- monitor changes to public access patterns resulting from its development and advise AEP if any of these appear to have unduly increased the risk of legal or illegal carnivore mortality; and

- carry out any studies needed, in consultation with AEP and Parks Canada, as appropriate, to examine current wildlife movement patterns across the proposed mine site and to establish the likely minimum conditions (e.g. location, width, degree of cover) necessary for such corridors to be effective.

Upper Cardinal River

As noted earlier, the Panel has some concerns regarding whether the Carnivore Compensation Program will adequately address carnivore impacts over the long term. Of particular concern is the potential blockage of carnivore movements from Jasper National Park to provincial lands. At the hearing, the Panel was struck by the high quality of the upper Cardinal River habitat for carnivores and by the relatively low habitat effectiveness of the region based on the CEA models due apparently to road development within the valley. The upper Cardinal River would appear to offer, with only minor changes in current land use zoning, a significant opportunity to provide wildlife with well defined linkages to the Cardinal Divide Natural Area, and ultimately to other areas such as the MacKenzie Creek drainage. The Panel notes that the Coal Branch Access Management Plan is to be evaluated by AEP in the fall of 1997. The Panel would suggest that a re–examination of the current access patterns in the upper Cardinal River watershed could provide a significant opportunity to compensate for carnivore habitat losses. This would be particularly important if CRC is ultimately unable to successfully establish the Carnivore Compensation Program.

4.4 Ungulates

4.4.1 Views of the Applicant

CRC advised that, in its view, the maintenance of ungulate populations in the Cheviot area was particularly important as: (1) ungulates provide a prey base for the larger carnivores; (2) they require diverse vegetation and topography, meeting their habitat needs also fulfils those of a wide assemblage of species; (3) they possess relatively large home ranges, forcing planners to work at a landscape level; (4) their grazing activities can affect the development of grasslands which in turn are related to erosion and runoff control; and (5) their response to reclamation activities can be used as a measure of success as well as to fine tune reclamation planning.

Study Area

Detailed ungulate work was completed in an area encompassing 445 km^2 which included the Cheviot mine permit area, the lands between the Nikanassin Range and ranges to the west, and the area between Red Cap Creek and the Luscar mine. As well, impacts of the proposed project were put into a temporal and spatial perspective with existing and future demands by conducting a CEA for elk. This assessment was conducted within a regional setting of 900 km^2.

Existing Conditions

CRC selected five species (elk, moose, mule deer, whitetailed deer, and bighorn sheep) as the appropriate VECs for its assessment. CRC provided data from surveys for ungulates carried out from 1992 to 1995. All five ungulate VECs were observed in both the Luscar and Cheviot mine areas. CRC noted that the majority of the Cheviot project area is zoned as critical wildlife habitat in the Coal Branch Sub-Regional Integrated Resource Plan. CRC also recognized that the Whitehorse and Prospect Creek areas have been identified in the Integrated Resource Plan as

providing regionally significant elk habitat and that the front ranges of the Rocky Mountains provide critical habitat for bighorn sheep. CRC also noted that the wildlife objectives for the Integrated Resource Plan include increasing elk and mountain goat populations while maintaining bighorn sheep populations.

CRC stated that elk populations in the area of the Luscar mine are considered to be distinct from those in the Cheviot mine area, although some level of interchange between the populations appears to occur. Within the vicinity of the Cheviot mine, elk were primarily found on: Drummond, Prospect, and the lower reaches of Cheviot, Thornton, and Harris Creeks; either side of MacKenzie Gap on south facing slopes of the Nikanassin (Red Cap) Range; and upper subalpine drainages on the south side of the peak of Red Cap Mountain. During the winter, CRC observed that elk were usually found in open canopy coniferous habitat with a shrub understory. Elk were observed to make use of a large mineral lick located in the headwaters of Prospect Creek, as well as licks in Thornton and Harris Creeks.

CRC noted that elk populations in the region have been surveyed by AEP since 1983. Total numbers in the Mountain Park area are considered low, in the range of 90–100 animals, and the historic increases seen in other regional herds have not occurred. In general, management efforts to increase elk population size in the area do not appear to have been successful, although CRC did note that elk are currently using reclaimed portions of the Luscar mine site.

Moose densities (0.34/km^2) in the Cheviot area were considered by CRC to be consistent with those found in other mountainous regions and somewhat lower than in boreal habitat. In the winter, moose are generally found at a small area at the mouth of Red Cap Creek; a much larger area encompassing the upper reaches of Red Cap and MacKenzie Creek and all of Harris Creek, the upper reaches of the McLeod River and portions of Cheviot and Thornton Creeks; and the river terraces in Whitehorse Creek at the mouth of Drummond Creek. Moose were most frequently observed in open canopy coniferous forests with a shrub understory in the winter, while in the summer they were observed in a variety of habitats.

CRC stated that mule deer densities (0.27/km^2 in 1994) would generally be considered to lie between poor and moderate on a provincial basis. CRC observed that mule deer do make use of the reclaimed areas of the Luscar mine site and numbers there have increased from 45 in 1990 to 92 in 1994. During the winter, CRC stated that mule deer are generally found in four areas: the McLeod valley north of Inland Cement, including the Luscar mine; north of Cadomin Mountain and west of Watson Creek; an area of Little MacKenzie Creek; and north of the peak of Red Cap Mountain. During the summer, CRC suggested that mule deer appeared to be concentrated along the reaches of the McLeod River between the mine site and Cadomin. Mule deer tended to use open canopy coniferous habitat in early winter, but later shifted to subalpine meadows.

Whitetailed deer were very uncommon within the area, with only five observed during three winter surveys in 1994. CRC observed that provincially optimum habitat for this species is aspen parkland, and that their distribution in grassland and boreal mixed wood ecoregions was often restricted by cover and snow depth, respectively.

Bighorn sheep were the most abundant ungulate observed by CRC. However, most were located

outside the Cheviot mine permit boundary with relatively large numbers of sheep resident on reclaimed portions of the Luscar mine site. Bighorn sheep were observed in the headwaters of Prospect Creek, on Cadomin ridge, and in an area of the Nikanassin (Red Cap) Range south–east of MacKenzie Creek. Bighorn sheep were primarily observed in alpine habitat throughout the year. In winter, windswept or sunny grasslands in proximity to cliffs were preferred, while in summer both open grasslands and, to a lesser degree, lower shrubland habitat, was used.

Expected Effects

CRC noted that ungulates in the region may experience both indirect impacts (i.e. habitat loss, barriers to movement, and harassment) and direct impacts (i.e. mortality due to vehicular collisions and increased legal and illegal hunting), as a result of the development of the Cheviot Coal Project.

The development of the Cheviot mine and the office complex were predicted to result in the loss of habitat for all ungulate VECs. For elk, a number of areas will be disturbed, while for moose habitat loss will generally be in the area of Harris and upper MacKenzie Creeks. Mule deer habitat in Cheviot, Thornton, and Prospect Creeks will be lost, while bighorn sheep habitat losses will occur primarily in upper Prospect Creek. As a result, CRC predicted that 10.8 per cent of the core elk winter range south of the Red Cap Range, 26 per cent of the moose core winter range, 13 per cent of the mule deer core winter range, and 1.6 per cent of the bighorn sheep core winter range will be affected. CRC also noted the potential loss of four mineral licks, with the largest also located in upper Prospect Creek. Habitat loss for elk, because it is located in the Harris–Cheviot Creek areas, will occur almost immediately during the earliest stages of mine and processing plant construction.

CRC estimated that, should the mine be approved, hiding cover for elk and moose would require 25–35 years (pine) or 35–45 years (spruce) to become re–established on the reclaimed Cheviot mine. During this time elk would be able to use forage resources located at the edge of the disturbance area where large blocks of undisturbed habitat would exist. Moose use of the reclaimed landscapes would be delayed, however, until significant shrublands were established (16 years minimum). Once shrublands were established, CRC expected that moose, like elk, would forage at the edges of the disturbance area until tree growth was tall enough to provide hiding cover. CRC observed that if the integrity of forested areas beyond the mine boundary are not maintained until tree cover planted on the disturbed sites is usable again by elk and moose, then habitat which could provide forage for these species would presumably be even less available.

In addition to direct habitat loss from construction and operation of the mine and coal processing plant, CRC noted that elk, moose, and mule deer movement patterns will be at least initially disrupted by the creation of large open areas, up to 2.8 km across in the Cheviot Creek area and 1.5 km across in the Red Cap Creek area. Elk movement would be disrupted between Prospect and Cheviot Creek and in the vicinity of the former townsite of Mountain Park, as well as along Harris Creek. Moose and mule deer movement from the high shrublands located below the Cardinal Divide Natural Area to the lower reaches of MacKenzie Creek would also be disrupted by mining and valley fills. The disruptions would force wildlife to establish new movement

corridors; a process which would cause them to expend energy not normally required, and making them more vulnerable to predation. If new movement patterns cannot be established, abandonment of portions of range may result. CRC also noted that the highwalls created by mining, if not appropriately modified, may actually attract bighorn sheep into the area and that this may be inconsistent with area wildlife management objectives.

In the longer term CRC maintained that the Cheviot mine was not expected to be a significant barrier for ungulate movement. CRC noted that the proposed mine will be developed progressively, like the Luscar mine, and that there would be large areas which would either be undisturbed or in the process of reclamation at any point in time. CRC noted that previous experience at the Luscar mine indicated that progressive development of this type facilitates wildlife (especially ungulate) movement through active mining and reclamation areas.

CRC also noted that development of the Cheviot mine will result in the displacement, to a large degree, of existing human use of the area for recreation and hunting. In the absence of careful access management planning, CRC felt that this could create added pressure on regional ungulate populations, particularly along the periphery of the mining operations.

CRC stated that the proposed transportation corridor lies entirely within mule deer winter range, it intersects elk winter range throughout the length of the McLeod River upstream of Whitehorse Creek, and intersects moose winter range between Prospect and Cheviot Creeks. Several areas along Grave Flats Road were identified where a high incidence of wildlife crossing or congregation along the roadway currently occurs. Mule deer and bighorn sheep commonly cross between Cadomin and Whitehorse Creek campground, and mule deer, elk, and moose all cross the road between Whitehorse Creek campground and the end of the transportation corridor at the rail loop. CRC noted that a reduced use of preferred habitats within specified distances from roads and trails had also been shown by a number of researchers and similar effects were likely to occur along the Grave Flats Road. CRC predicted that upgrading of the Grave Flats Road would likely also result in increased ungulate mortality due to collisions, while the risk of direct mortality from trains, due to their low speeds, was felt to be low. Mortality risk from collisions with vehicles would be further increased due to the attraction of ungulates to road salt.

CRC also noted that elk are particularly vulnerable to human disturbance and hunting mortality in the areas immediately adjacent to the former townsite of Mountain Park, and at the junction of the Grave Flats Road and Highway 40. CRC noted that the elk population located south of the Nikanassin (Red Cap) Range will tend to absorb the impacts of mining operations, while elk populations north of the Nikanassin (Red Cap) Range would tend to be more directly affected by the transportation and utilities corridor. CRC believed that moose are particularly susceptible to human disturbances and human caused mortalities on Highway 40 in the vicinity of Luscar and Trapper Creeks, in the Thornton Creek area, the upper McLeod River valley south of the former townsite of Mountain Park, the Cardinal River valley, and, to a lesser degree, along Harris Creek and the headwaters of MacKenzie Creek. Mule deer are susceptible to human disturbance and human caused mortality all along the McLeod River corridor. After mining is completed, no further impacts from either the rail line or the transmission line would occur. The upgraded highway was expected, however, to be a source of residual impact on ungulates in the McLeod River valley.

Cumulative Effects

CRC carried out a CEA for elk, based on a model developed in western Oregon and using AEP survey data for population trends. The CEA model suggested that regional habitat effectiveness for Class 1 and 2 elk habitat had been reduced, due to existing human disturbance, by 38 per cent for winter forage, 46 per cent for summer forage, 21 per cent for winter cover, and 22 per cent for summer cover. Development of the Cheviot Coal Project, CRC predicted, would result in further reductions in regional winter and summer forage of 3 per cent and 2 per cent respectively, and an 8 per cent reduction in both winter and summer cover. While CRC predicted that for elk, at these levels of habitat reduction, existing habitat should be able to absorb any displaced animals, the ultimate mitigation of habitat loss for all ungulates, including elk, depended primarily on rapid reclamation of disturbed areas. CRC also suggested that current low productivity levels of elk in the region indicated a sensitivity to further stress and that management strategies needed to reflect this.

Mitigation

CRC identified a number of potential mitigation options which it was prepared to consider in reducing the impacts of the surface mine and of the transportation and utilities corridor on ungulates. While no specific commitments were made, CRC did commit at the hearing to work with other interested parties, including public interest groups, to make appropriate changes to its mine plan to deal with these and other issues. In order to mitigate impacts due to the construction and operation of the surface mine and coal processing plant, CRC indicated it would consider the following:

- Maintaining tree and shrub cover wherever possible, including forested areas adjacent to the mine, and avoiding placing infrastructure through these areas.

- Reducing the disturbance of riparian and other valley bottom habitat by minimizing the placement of either haul roads or wash rock dumps in these areas.

- Avoiding the disturbance of mineral licks and, where new licks are created by mining, leaving these areas exposed and unvegetated.

- Designing revegetation programs to meet the needs of ungulates as soon as possible, including planting trees around the office/coal processing complex in order to reduce sight lines, reclaiming the slopes above upper Cheviot Creek and the east arm of Prospect Creek to forage palatable to elk, developing extensive areas of shrublands for moose, and ensuring the upper Prospect Creek reclamation program meets the needs of bighorn sheep.

- Avoiding the creation of new access into the east end of the mine permit area from the Grave Flats Road.

CRC stated that requiring permanent undisturbed wildlife corridors were not considered to be an

acceptable mitigation strategy since in order to be maintained across the proposed project area, they would substantially limit CRC's ability to maximize recovery of the coal resource. For example, a wildlife corridor or riparian buffer zone through the MacKenzie Creek drainage would result in the loss of some 12 million tonnes of coal.

Potential mitigation options for the transportation corridor suggested by CRC included:

- Avoiding the creation of new access from the Grave Flats Road into Prospect Creek.
- Educating workers and others with regard to potential wildlife hazards along the road and marking high hazard areas with signage.
- Ensuring, wherever possible, that road embankments are designed to avoid trapping animals, that views are unobstructed in areas of high wildlife use, and calcium chloride is substituted for sodium chloride.
- Following existing disturbance for the new power line wherever possible, and generally maintaining as much shrub and woody vegetation as possible.

In its application, CRC noted that elk have responded positively to reclamation efforts at CRC's Luscar mine and at other mining locations such as Elkview in British Columbia while bighorn sheep have voluntarily colonized the reclaimed landscapes of the CRC Luscar mine, producing an increase in the regional population. Also, reclamation trials for browse in moose habitat had shown positive results in Alaska. CRC believed that ungulates will respond similarly to reclamation at the Cheviot mine.

CRC stated that, while mining was underway, elk and other ungulates would have to re–establish annual movement and foraging patterns in adjacent habitat. CRC felt that the implementation of the Coal Branch Access Management Plan prior to mining would be beneficial to this process by making recreation use somewhat predictable, and thereby reducing human pressure on wildlife. CRC believed that once reclamation is initiated, the impact on the elk would be lessened as quality forage becomes available at the edge of the mining disturbance. Furthermore, as trees become tall enough to provide hiding cover, elk will be able to more effectively use the disturbance area. As a result, CRC felt that renewed growth in the regional elk population should be possible sometime during the reclamation process. The final reclaimed landscape, in conjunction with the undisturbed natural landscape should, in CRC's view, eventually be able to support the Integrated Resource Plan target population for the area of 200 animals. Once canopy closure was achieved, CRC predicted that impacts on the regional elk population could be considered to be insignificant as all the basic elements of their habitat requirements would then be in place. CRC noted that monitoring of the elk population during this period was important since maintaining a viable elk population through the early stages of mining would be needed in order to effectively recolonize the reclaimed habitat.

CRC believed that all the other ungulate species would go through a similar process as elk, but the time frames would vary depending on their habitat requirements.

CRC felt that once ungulate use of the reclaimed areas had been established, then human use of the reclaimed landscape could be introduced in a planned fashion. To ensure that a viable elk population remains in the Cheviot area both during and after the life of the proposed mine, CRC recommended that the following measures be considered by the appropriate regulatory authorities:

- monitor and manage human recreation in the Cadomin area to minimize disturbance of elk;
- identify nodes of high quality habitat and restrict human access and other development in these areas;
- coordinate logging and other future development to prevent additive loss of quality elk habitat; and
- plan the re–introduction of people onto the reclaimed landscape after mining

CRC recognized that implementation of the above measures would require cooperation between government agencies, the various industries, and other users of the area.

Monitoring and Follow Up

CRC suggested a number of general monitoring programs that it felt should be considered. These included:

- monitoring of the site during mining activities in order to identify any new mineral licks created by mining operations;
- monitoring, once the Coal Branch Access Management Plan is implemented, of any designated access routes to determine human use levels, ensure hunting levels are not too liberal, and prevent the development of new access into undisturbed blocks of adjacent forest habitat; and
- assess the response of the area elk populations to mining activities.

4.4.2 Views of the Interveners

The AWA Coalition had several concerns regarding the potential impacts of the Cheviot Coal Project on ungulates. They noted, for example, that CRC may already have begun to have an impact on ungulates (e.g. as a result of keeping open the Grave Flats Road up to the mine site during the winter), and observed that CRC had made no mention of any monitoring of these effects.

The AWA Coalition noted that two ungulate species, mountain goat and woodland caribou, were identified to have historically used the Cheviot area. In the view of the AWA Coalition, approval of the Cheviot Coal Project would preclude restoration of these two species.

The AWA Coalition also believed that the CRC application was at odds with the Coal Branch Sub–Regional Integrated Resource Plan for other species of ungulates since, in its view, the Cheviot Coal Project would remove existing core habitat for these species as well as place additional stress on the populations. This, they argued, was completely inconsistent with the Integrated Resource Plan's goals of re–establishing ungulate populations and its classification of the area as a critical wildlife zone. Furthermore, there was no evidence that CRC's proposal to restore reclaimed areas to grassland would ultimately be beneficial for elk, as claimed, since there was no evidence that existing grassland was a limiting factor for elk, or that elk populations had increased as a result of their use of the Luscar mine site. The AWA Coalition believed that the Cheviot Coal Project would in fact place further stress on elk populations and make it impossible to restore regional populations.

The AWA Coalition noted that CRC had not made any specific commitments to mitigation of impacts of the transportation and utilities corridor on ungulates despite having identified crossing points and areas where animals congregate. They also noted that CRC had no plan for protecting movement corridors through the mine permit area, but only proposed a general study of the issue. The AWA Coalition noted that CRC had apparently placed social values above wildlife values in its selection of the Harris Creek site over the Mountain Park site for the coal processing plant.

The AWA Coalition expressed concerns with the CEA for elk. In particular, they noted the model, in their view, did not include existing and imminent developments in the region, nor did it distinguish between northern and southern populations. The RMEC also questioned some of the model parameters, particularly the relationship used to assess the impact of roads on habitat effectiveness for ungulates. Finally, the AWA Coalition questioned CRC's interpretation of the likely environmental effects on elk. Given predator pressure, plus loss of corridors and cover, they did not see how elk populations could begin to recover with the initiation of reclamation. They also questioned whether CRC could begin to restore elk populations in less than 100–145 years, particularly since CRC could not be sure any elk would be available for colonization that far into the future. The AWA Coalition also believed human activities were likely to be displaced to lands adjacent to the proposed mine, which would further increase the extent of impacts.

The Smallboy Camp noted that they were very concerned that CRC's reclamation program at the Luscar mine had the potential to significantly disrupt bighorn sheep ecology in the region. They suggested that the unnaturally high quality of forage, high growth rates, the proximity between very large numbers of animals, and the absence of normal predation had created ecological risks for the Luscar population and possibly other bighorn sheep populations as well. These risks included increased chances of disease transmission within the Luscar herd and possible maladaptive shifts in the area gene pools if rams from the Luscar population have a reproductive advantage over resident rams which does not also translate into a selective advantage for any resulting progeny.

The Alpine Club Coalition noted a number of concerns for ungulates in general. In particular, they suggested that, in order to re–introduce human use in an orderly fashion, the Coal Branch Access Management Plan must be implemented and any access routes designated under the Coal

Branch Access Management Plan should be closely monitored. As well, no new access routes should be cut in adjacent forest blocks, human use on the mine periphery should be limited, and the east end of the mine area should not be connected to the Grave Flats Road.

The Alpine Club Coalition observed that, while CRC had had good success in re–establishing bighorn sheep at the Luscar mine, elk were only just beginning to come back after 20 years. They noted that while the grasses needed for sheep fodder are relatively quickly established, shrubs for moose browse and trees for sheltering elk take decades. They also noted that off–highway vehicle use is much more limited around the Luscar site. Furthermore, they noted that mine development will displace both off–highway vehicles and ungulates, thereby increasing the risk of conflicts on adjoining lands.

AEP stated that, in its view, CRC's proposed mitigation plans will create suitable elk habitat. However, AEP noted that CRC's mitigation proposals included implementation of the Coal Branch Access Management Plan which was currently being implemented through a system of voluntary compliance for a trial period. AEP also noted that CRC may need to consider, if elk populations for whatever reason are no longer available to re–colonize the Cheviot mine, possible enhancement of other elk ranges or funding elk transplants. However, AEP also noted that the Integrated Resource Plan states that no further elk transplants will be undertaken until access management is implemented.

The Alberta Fish and Game Association also raised concerns regarding the relationships between access and wildlife, particularly ungulates. They noted that reclamation at the Luscar mine had been so successful in re–establishing habitat for bighorn sheep that the populations there now represented serious management difficulties. The Luscar mine had, in their view, become a de facto sanctuary with protection from human hunters and little predation from carnivores due to their sensitivity to humans.

The Alberta Fish and Game Association observed that it was very unclear as to how wildlife populations in the Luscar mine were going to be managed once the mine shut down. Options included: (1) simply returning the land to past, pre–disturbance hunting practices (an option which the Alberta Fish and Game Association described as catastrophic); (2) setting the area off limits to hunting in order to provide watchable wildlife/ecotourism opportunities; or (3) establishing a limited entry hunt until sheep, elk, and deer herds had adjusted to human presence (which was the option favoured by the Alberta Fish and Game Association).

The Alberta Fish and Game Association observed that such problems could be avoided at the Cheviot mine by continuing to allow a full range of human activities at the mine, including hunting, in order to avoid an unnatural build up of wildlife. This, they believed, could be accomplished by: (1) allowing existing management policies to remain in place as long as possible in areas of the mine lease where development will not occur for some years to come; and (2) returning reclaimed lands to public use as soon as possible. With regard to the latter suggestion, the Alberta Fish and Game Association felt that foot access activities, including hunting, should be possible in most cases within five years of completion of reclamation groundwork.

CEPA stated that, in its view, it was important that CRC not develop one animal habitat type at the expense of another and further, should be encouraged to develop habitat for a range of both small and large mammals. CEPA believed that it was also very important that CRC avoid the development of "domesticated" herds, such as had occurred, in its view, at the Luscar mine site. CEPA noted that the Luscar mine bighorn sheep populations had become very accustomed to human presence and felt that these animals would be very vulnerable once access to the Luscar mine for hunting became available. To prevent this, CEPA suggested CRC needed to encourage animals to follow their traditional migratory routes into and off of the mine site, in part by allowing ongoing access to hunters.

4.4.3 Views of the Panel

In considering the potential environmental effects on ungulates, the Panel believes that CRC has adequately described the historic and existing ungulate populations within the proposed Cheviot Coal Project, and their use of regional habitat. The Panel notes that three species, moose, mule deer, and whitetailed deer, while found within the study area, are generally at relatively low densities. This appears to be more a function of general habitat quality than due to anthropogenic causes. Two other species, mountain goats and woodland caribou, appear to have made historical use of the area, but appear to no longer occur within the region likely directly affected by the Cheviot Coal Project. The Panel notes that bighorn sheep populations in the area are considered by AEP to be healthy and stable and are able to withstand what appears to be a relatively intensive level of hunting. Elk populations, on the other hand, are below what AEP believes is the reasonable carrying capacity of the region and increasing these populations is identified in the Coal Branch Sub-Regional Integrated Resource Plan as an important goal for the area.

Based on the evidence provided, the Panel is prepared to accept CRC's estimates of the expected effects of development and operation of the surface mine and coal processing plant on ungulate populations as reasonable. The Panel accepts that during site clearing, mine and plant construction, and mine and plant operations, habitat will be lost and ungulate populations displaced. Furthermore, normal movement patterns by ungulates across the mine site will be disrupted, possibly extensively. While some impacts can be expected to extend beyond the life of the mine (i.e. 20+ years), the Panel does believe that ungulate populations can be re–established progressively within a reasonable time frame, thus lessening the impact, particularly given CRC's commitment to enhancement. The Panel also believes that ungulates in general will be better able to adapt to human activities within the active mine areas, provided they are not harassed, than some other wildlife species such as wolves or grizzly bears. As a result, during active mine development, the Panel believes that CRC's prediction that ungulates will continue to use undisturbed habitat at the periphery of and within the surface mine is reasonable, provided these areas are properly managed.

The Panel notes that the AWA Coalition on numerous occasions argued that the Cheviot Coal Project was inconsistent with government policy for ungulates in general and with government planning policy, as set out in the Integrated Resource Plan, in particular. However, the Panel notes that in fact the Coal Branch Sub-Regional Integrated Resource Plan clearly states on page 69 under Guidelines for the Mountain Park–Folding Mountain Resource Management Area that:

> *"4. Coal exploration and development in the Mountain Park Critical Wildlife Zone and General Recreation Zone will be allowed under existing approval processes and will not be prevented or pre–empted by other interim land uses. In the Critical wildlife Zone, coal exploration will be allowed with a commitment from the developer to ensure maintenance of adequate usable habitat to allow elk population objectives to be met."*

The IRP goes on to state (page 70) that the objectives for the Resource Management Area include:

> *"1. To increase the elk population from 90 to 200 animals, primarily in the Whitehorse Creek, Prospect Creek, Mountain Park area."*

Based on the above, the Panel believes that since CRC has provided a commitment to the protection and/or provision of elk habitat at the Cheviot Coal Project which, at a minimum does not reduce the current opportunity of meeting RMA objectives for elk populations, then it is reasonable to assume that the application is consistent with the Integrated Resource Plan.

The Panel also notes that CRC's commitments to mitigate the impacts resulting from its surface mining activities were questioned by interveners. The Panel believes that, with regard to the re–establishment of vegetation suitable for both browse and cover as quickly as possible, which is CRC's primary mitigation strategy for impacts to ungulates, CRC has adequately demonstrated that it is both prepared and able to carry out this program. In particular, the Panel notes CRC's ability to re–establish habitat for bighorn sheep and other ungulates on its Luscar mine property. As noted earlier in this report, the Panel accepts that it is very likely that CRC's reclamation plans will favour some species over others. In the case of the Cheviot Coal Project, this would presumably be for elk populations. However, since specific natural habitats are more suitable for some species than others, the Panel does not view this as intrinsically an adverse effect. Furthermore, the Panel does believe that normal successional patterns will ultimately create a mosaic of habitat types and so eventually increase overall ungulate diversity within the area.

Control of access to both the mine site and to surrounding lands was noted by both CRC and by most interveners, including AEP, as being an important component of the ultimate success of CRC's mitigation strategies for ungulates. The Panel also agrees with this view. During development of the mine, the Panel notes that CRC has committed, provided both worker and public safety can be preserved, to allowing public access to undeveloped portions of the mine to continue. The Panel believes that this is reasonable. However, the Panel also agrees with the common view that without careful control, increased human use of high quality ungulate habitat, either within or immediately adjacent to the Cheviot mine, can potentially jeopardize the ultimate success of CRC's mitigation programs. This is likely particularly true during periods when mine activity is high and/or when animals are just beginning to re–establish themselves into newly available habitat.

The Panel believes that increased pressure from human activity which could affect CRC's mitigation program for ungulates may come from several sources. One would be the creation of

new access into areas previously not readily accessible by the public. For the Cheviot Coal Project, the most likely areas of concern would include: access along either the MacKenzie Creek or Prospect Creek valleys; from the eastern end of the project from Grave Flats Road; or into the Cardinal Divide Natural Area. A second source of pressure on ungulates would be the relocation of off–highway vehicles and hunters, which currently make use of the mine permit area, into adjacent areas. Assuming that the total numbers using the region remain roughly the same, the increase in impacts to ungulate populations from displaced recreational users could easily be disproportionately much higher than the actual increase in the number of users.

The Panel also believes that the process of re–establishing of human use onto the mine site following reclamation will also be critical to the success of CRC's mitigation programs for ungulates. The current situation at the Luscar mine, which contains a very large population of bighorn sheep strongly habituated to human presence, provides an excellent example of this concern. The Panel believes that all programs designed to restore ungulate populations must, at their outset, have a clear view as to the ultimate end use or uses proposed for the area. With that in mind, it will be much easier to ensure that all programs are designed so as to meet those goals.

A fourth source of impacts on the success of CRC's program to mitigate impacts on ungulates would be the cumulative effect from the loss of forest cover in areas surrounding the mine site. The Panel believes that preservation of these areas, until adequate tree cover is established on the mine site itself, will likely be a key component for successful re–establishment of ungulate populations. The Panel notes that all four sources of impacts on ungulates described above (i.e. human use patterns of non–lease areas during mining, the impacts of relocation of human use from the mine lease, the re–establishment of human use of the mine lease following mining, and the loss of ungulate habitat adjacent to the mine lease) are all, to some degree, beyond the direct control of CRC.

With regard to the transportation and utilities corridor, the Panel believes that upgrading of the Grave Flats Road will result in some reductions in habitat effectiveness, particularly during the winter months when the road has traditionally not been opened. Furthermore, the Panel expects that increases in direct mortality due to collisions with vehicles will likely increase. These impacts, which will continue over the life of the mine, may be significant if the proposed mitigation measures are not effective. The Panel does see merit in the changes to the general road design proposed by CRC to mitigate against impacts to ungulates and will expect these to be carried out. However, the Panel continues to be of the view that the most effective mitigation tool remains a general reduction in speed limits along the Grave Flats Road. The Panel also agrees, as noted earlier, that no new access to Prospect Creek from the Grave Flats Road should be created by CRC.

Cumulative Effects

With regard to the impacts on ungulates, the Panel does not believe that the incremental changes in regional ungulate populations will be so great as to require other foreseeable uses of the area for either recreation or industrial development to be foregone. The two exceptions to this could be first, a delay, perhaps for several decades, in forest harvest operations at the periphery of the mine in order to preserve cover for ungulates and second, the need to forego or reduce some

recreational activities on or nearby the mine site in order to optimize ungulate re–establishment into the mine site. The Panel also believes that, if effectively managed, the existing Luscar mine site may provide some opportunities to offset the cumulative effects of the Cheviot Coal Project on ungulates.

With regard to the concerns raised by the Smallboy Camp regarding current ungulate management practices at the Luscar mine and their cumulative effects, the Panel agrees that creating large populations of a single species on limited areas and without normal population controls such as predation (by either man or carnivores) is not good long–term management practice and likely does represent some, albeit unknown, increased risk of disease or similar problems. However, the Panel is confident that both CRC and AEP are well aware of such issues and will address these questions in their final design for the Luscar mine site. The Panel does agree with the Smallboy Camp that this issue is a serious one and would expect, as discussed earlier in this section, that CRC and AEP will ensure that end–use goals for the Cheviot Coal Project are more clearly established and so hopefully avoid the problem in the future.

With regard to the second issue raised by the Smallboy Camp regarding the genetic fitness of Luscar mine rams, the Panel does not share their concerns. While it may be true that younger rams from the Luscar mine may, due to their larger size, have a reproductive advantage over resident rams in other regional bighorn sheep herds, the Panel believes that the general demands of the rut will ensure that any successful male, while perhaps not the "fittest" in some senses, will still be very likely to produce healthy offspring. Even assuming that there was a selective disadvantage for those offspring, normal genetic variability plus time would ensure that such effects are temporary.

Monitoring and Follow Up

If the Cheviot Coal Project is approved, the Panel will require that CRC initiate ongoing studies of changes to ungulate use of the Cheviot mine permit area as soon as possible. These data should be very useful in confirming current habitat use patterns by ungulates, including potential corridor locations (as discussed in Section 4.3), as well as determining the minimum size of undisturbed habitat blocks needed to allow either use or travel by ungulates.

The Panel will also require that CRC continue to monitor general human use patterns surrounding the mine site, and be prepared to advise AEP whenever it believed that human use, including new access, was at levels which potentially could reduce area values for ungulates. CRC will also be required to monitor and report on ungulate use of the Grave Flats Road and the relative success of the various mitigation programs. Ongoing monitoring during mining activities to identify new mineral licks will also be needed.

4.5 Small Mammals and Amphibians

4.5.1 Views of the Applicant

CRC carried out research on the relative numbers of several groups of small mammals and amphibians potentially affected by the Cheviot Coal Project. The mammals examined included:

shrews and rodents; bats; and hares and pikas. CRC did not carry out studies on terrestrial invertebrates as these were not raised in the EIA Terms of Reference or during public consultation as VECs. CRC did, however, respond to comments regarding butterflies raised at the public hearing, and this issue is addressed in this report section as well.

Study Area

CRC established 48 traplines within eight habitat types for shrews and rodents. These extended throughout the mine permit boundary and along the Grave Flats Road to the north and to the east of the mine permit boundaries. Data collection on bats focused primarily on the bat hibernaculum in the Cadomin Caves, which is located just south of the Hamlet of Cadomin. Additional summer data for bats were collected from Cadomin to the former townsite of Mountain Park. Evidence of hare distribution was measured during ungulate winter count surveys. Data on pikas, other small mammals, and amphibians were collected incidentally.

Existing Conditions

A total of 175 small mammals representing nine species were captured in CR ?'s sampling program. Two additional species (bushy–tailed woodrat and muskrat) were not sampled but felt likely to occur within the general study area. A sharp increase in small mammal density was noted between the two sample years; such variability was described by CRC as common in small mammal populations. Of the habitat types within the region, deciduous, riparian, and open coniferous or upland shrub had the highest densities of small mammals. The deer mouse was the most common species in both years, while meadow voles exhibited the largest increase between years.

CRC stated that four species of bats have been found hibernating within the Cadomin Caves, which is one of four known bat hibernacula in Alberta. Land use guidelines for the Caves state that public access will not be promoted during the swarming and hibernation periods (10 August to 30 April). Based on several years of data collected by AEP, the bat population using the Caves appears to be relatively stable at around 400 to 600 bats. No bats were observed by CRC in the general region of the mine area during the summer survey.

Pikas were observed by CRC on five different occasions in the Cheviot area, primarily in alpine terrain to the west of the mine permit boundaries. Snowshoe hares were among the most abundant furbearers on the Cheviot mine site and found in a range of habitat types. Other mammal species recorded included least chipmunks, hoary marmots, golden-mantled ground squirrels, red squirrels, beavers, and porcupines.

Two species of amphibians (wood frogs and western toads) were observed within the study area. Neither species is considered endangered in Alberta. Toads were observed along the McLeod and Cardinal Rivers; and Luscar, Watson, and Prospect Creeks. Wood frogs were found at a single location in beaver ponds at Watson Creek, which is located downstream of the Hamlet of Cadomin.

Expected Effects

CRC expected that the impact of mine development on small mammals would include direct mortality due to clearing and indirect mortality due to habitat loss. Once reclamation was initiated CRC predicted, at least in the early stages, that existing densities of small mammals will return but that diversity would remain low until the diversity of new vegetation also increased. Therefore, mitigation of impacts on these species would require returning the mined areas to a diverse plant community as quickly as possible.

In the EIA, CRC predicted that no impacts from mine activities (e.g. blasting) on the use of the Cadomin Caves by bats would occur. When questioned at the hearing, CRC did confirm that it was considering locating a construction camp at the trailhead of the relatively steep trail to the Caves, but did not anticipate this would have a negative effect. CRC advised that it felt that AEP's ongoing monitoring of the Caves should continue during the construction and initial operating phases of the project, but that it did not believe it was appropriate for the company to tell either its employees or contractors that the Cadomin Caves was off limits or to try to enforce such a rule.

The primary source of impacts to amphibians was felt to be from the loss of riparian habitat within the mine site and during the construction of the road and rail line. Possible mitigation included maintaining wetland habitats, minimizing the clearing of riparian habitat, and preventing excessive siltation. A second source of impacts was either direct mortality of animals during their movements across areas of high traffic or indirect effects on movement due to avoidance of large open areas associated with the mine. No mitigation for these impacts was suggested. No cumulative effects on either small mammals or amphibians were predicted.

In final argument, CRC advised the Panel that while no butterflies of concern that could be impacted by the Cheviot Coal Project had, in its view, been identified, it was prepared to consider their nutritional requirements in its reclamation program.

4.5.2 Views of the Interveners

No specific concerns were raised either in interventions or at the hearing with regard to either small mammals, with the exception of bats, or amphibians. The Alpine Club Coalition, in describing the relatively high number of unique species of organisms within the upper reaches of Prospect Creek, did note the presence of several unique species of butterflies in particular.

The AWA had a particular concern regarding disturbance of bat populations at Cadomin Caves. They noted that CRC had only examined the impacts of blasting at the surface mine and not road/railroad construction. They also noted that CRC was seriously considering locating a construction camp immediately adjacent to the trailhead leading to the Caves. In their view, this had the potential of greatly increasing the number of visitors to the Caves and therefore, the associated risk of disturbance, particularly during critical periods in the fall and winter. At the hearing, the AWA Coalition questioned CRC as to why it was not prepared to enforce a closure of the trail to the Caves to use by its employees and contractors or, alternatively, to re–locate the camp. In its application, the AWA Coalition also registered concerns with the cumulative

impacts on bats from other sources of blasting (e.g. Inland Cement, the Luscar mine, road construction) and from damage to the springs associated with the Caves (see Section 3.1).

4.5.3 Views of the Panel

The Panel is prepared to accept as reasonable CRC's description of existing conditions for small mammals and amphibians at the Cheviot mine. The Panel also agrees with CRC's view that any small mammals or amphibians using habitat subject to direct disturbance will also be highly vulnerable to either direct mortality or indirect mortality due to habitat loss. Furthermore, there are few opportunities open to CRC to mitigate these effects during the active mining phase other than reducing disturbed areas as much as possible.

The Panel does not believe, however, that in a regional context, either impacts on small mammals or amphibians will be significant. Nor does the Panel believe that there will be significant cumulative effects. The Panel notes that habitat losses will be extended over several years, allowing at least some areas to be reclaimed prior to the disturbance of others. While the populations of small mammals re–invading disturbed areas will very likely initially have different compositions than those presently occupying the site, the Panel is prepared to accept that the carrying capacity for small mammals in reclaimed areas will be reasonably high and further, that as vegetative diversity increases over time, immigration from surrounding areas will eventually allow the original species' diversity to be re–established. For amphibians, the Panel believes it is reasonable to assume that the permanent loss of riparian habitat will at least be partially compensated for by the extensive end pit lake development. The Panel has no specific requirements for monitoring or follow up programs for either small mammals or amphibians.

The primary exception to the above finding is potential impacts on registered traplines (see Section 6.5). There are currently three registered traplines within the area. The Cheviot Coal Project may have indirect effects on these through the disruption of the normal predator/prey relationship within and beyond the mine boundaries. This issue will need to be considered by CRC in its negotiations with the owners of these traplines.

With specific reference to bat populations within the Cadomin Caves, the Panel notes that there was no argument among the parties to the hearing regarding their provincial significance, or their relative sensitivity to disturbance. The Panel does not believe, however, that mining or other activities associated with mine operations will have a significant effect on the populations using the Cadomin Caves. With regard to access to the Caves, while the Panel believes that these animals must be adequately protected, the Panel can also understand CRC's reticence in trying to prevent its employees and contractors from using trails currently open to other members of the public. However, the Panel does not disagree with the position of the AWA Coalition that the location of a camp at the trail base could increase the risk of disturbance to the Caves, although the Panel does not believe that risk is significant.

Should CRC ultimately locate a construction camp south of Cadomin, the company will be required to initiate an education program for all camp users regarding the sensitivity of the Caves to disturbance. As well, CRC will be expected to monitor the use of the trail by its employees and contractors and, in conjunction with AEP, determine if usage levels warrant any further

intervention. However, any decisions regarding changes to access to the Cadomin Caves by the public is the responsibility of AEP.

4.6 Harlequin Ducks

4.6.1 Views of the Applicant

In its application, CRC noted that it had included the Harlequin duck in its analysis of potential environmental effects due to concerns raised regarding this species in Jasper National Park. CRC noted that the species was considered by AEP to be a species for which there are "no population concerns, and no specific management efforts required", and that Harlequins had not been identified as a species of concern in either the Terms of Reference for the Cheviot Coal Project EIA or during CRC's public consultation process.

Study Area

Surveys for breeding/nesting pairs of Harlequin ducks were carried out in 1995 and 1996 along the McLeod River from the Watson Creek campground to the bridge on the north side of the Cardinal Divide on the Cardinal River; and on Red Cap, Whitehorse, Drummond, Thornton, Cheviot, Harris, Powerhouse, West Jarvis, and MacKenzie Creeks.

Existing Conditions

Harlequin ducks are sea birds which nest along swiftly flowing mountain streams. Population estimates for the Pacific Northwest presented at the hearing ranged from 160,000 to 200,000 birds. The number of breeding pairs and breeding streams in Canada and Alaska are unknown. CRC reported on several scattered observations of the birds in Alberta and noted that no concerted efforts had been made to accurately determine their general distribution or the population size of breeding pairs in the province. East coast populations (less than 1,000 birds) of Harlequins are considered to be endangered, while west coast populations have shown significant declines, possibly due to damage of marine habitat (e.g. oil spills) and disturbance to breeding habitat.

Surveys carried out by CRC in 1995 suggested that from 9 to 14 and 5 breeding pairs of Harlequin ducks, respectively, may use the McLeod and Cardinal River drainages. Additional survey and banding work in 1996 indicated that as many as 60 birds may be using the region. Adult birds were noted particularly at the junction of tributaries with the upper McLeod River (e.g. Luscar, Cadomin, and Prospect Creeks), on Whitehorse Creek, and on upper MacKenzie Creek. Broods were observed at Red Cap Creek, MacKenzie Creek, and in the McLeod River downstream of the Mountain Park Staging Area. While no broods were observed in Thornton, Cheviot, or Harris Creeks or the upper McLeod River, CRC considered that these were also possible nesting habitat. CRC observed that Harlequin nesting habitat tends to be quite specific and generally occurred in the upper reaches of streams, and so was subject to high, rapid runoff (and associated risk of mortality to eggs), followed by a rapid return to clear water conditions, which was necessary to allow the birds to feed effectively. Nesting appears to take place in the upper reaches of the various streams, with the female and her brood then moving gradually

downstream over the summer. The birds are generally long–lived and females show high fidelity to their natal streams. Because males return to the ocean following breeding, only a single brood per year is possible. All of the above characteristics were felt by CRC to make the Harlequin particularly sensitive to disturbance and relatively good indicators of environmental quality.

Expected Effects

Both mining activities and development of the road, rail, and power line were anticipated to have an effect on Harlequin ducks. Possible sources of impacts were predicted by CRC to include: (1) disruption of flow regimes, particularly increased or multiple flood events and the associated risk of loss of nests; (2) sedimentation of streams and the associated risk of impacts on supplies of benthic food organisms; (3) general negative changes to existing stream morphology and associated habitat effects; (4) loss of riparian vegetation; and (5) increased human activity and associated disturbance of both nesting birds and their broods.

CRC estimated that its mining operations would result in the permanent loss of two probable nesting areas (Cheviot and Thornton Creeks) and portions of MacKenzie Creek and one of its tributaries. As well, Harris Creek, a possible nesting site, would be modified. Construction of the road, rail line, powerline, and coal processing plant were also considered potential sources, at least during construction, of sediment and bank de-stabilization, and so additional habitat loss. At the hearing, CRC also confirmed that it was not known how Harlequin ducks and their broods would respond to culverts when moving along area streams, but CRC did believe its culverts would not act as a barrier to downstream migration of broods.

CRC noted that, in its view, the presence of a probable nesting female on the McLeod River at the site of the former reservoir for the Town of Mountain Park may indicate that Harlequins have the potential to colonize disturbed areas. CRC also noted that since Harlequins were relatively long–lived, this may allow the birds to better adapt to short–term disturbance during construction. At the hearing, CRC also observed that very few intensive surveys for Harlequins had been undertaken in Alberta. In its view, the relatively high numbers observed at the Cheviot site could be an artifact of this lack of general survey data. All these factors led CRC to conclude that project impacts on Harlequins were likely to be insignificant, and that no cumulative impacts were anticipated. CRC did state that ongoing monitoring of the effectiveness of any mitigative measures should be carried out.

CRC described several mitigation strategies for impacts to Harlequins that it was prepared to consider during future detailed planning. These included:

(1) placement of temporary access roads, waste disposal sites, borrow pits, staging areas, etc in areas not immediately adjacent to the river;

(2) planning of construction around sensitive periods in the birds' life history;

(3) maintenance of a 100 m buffer along the McLeod River where possible;

(4) avoidance or reduction of stream crossings and the use of bridges rather than culverts;

(5) timing of flow releases to mimic natural patterns;

(6) further inventory of area streams to better identify key habitat for Harlequins; and

(7) ensuring that no new human recreation or access is encouraged on the McLeod River.

4.6.2 Views of the Interveners

In its submission and at the hearings, Environment Canada noted significant concerns with regard to the effects of the Cheviot Coal Project on Harlequin ducks, both within the mine site and by extension, to the birds on winter ranges in the Strait of Georgia. Environment Canada confirmed CRC's view regarding the current population status of the Harlequin as well as its ecology. However, Environment Canada also noted that in the northwest United States and British Columbia, Harlequin populations are generally listed as a species of concern, for a variety of reasons. Environment Canada also observed that in Alberta, Harlequin habitat is limited to the mountains and foothills and that within that range, their distribution is uneven. Sources of disturbance to these birds in Alberta included commercial rafting and tourism along the Elbow and Maligne Rivers, as well as general habitat damage and human disturbance.

Environment Canada noted that, based on the data provided by CRC, the McLeod drainage contained the second largest population of breeding Harlequins observed to date in Alberta. Environment Canada felt that until the McLeod River's relative importance to Harlequin populations in general could be established, significant limits should be placed on the proposed development. Environment Canada recommended that:

- on tributaries of the upper McLeod River of importance to Harlequins, that a 100 m disturbance free zone on each side of the streams be established;
- any waste rock dumps be designed so as to preclude the risk of failure into undisturbed streams;
- no construction activities occur between 1 May and 15 September within 100 m of streams supporting Harlequin ducks;
- the coal preparation plant and rail loop be relocated to an area of less importance to Harlequin ducks;
- bridges be used instead of culverts;
- stream flows be re-established on the surface over rock dumps instead of through rock drains;
- the rail line be relocated further away from the McLeod River in order to minimize construction disturbance; and
- measures be taken to discourage recreational use and access across the McLeod River.

Environment Canada also noted the need for both long–term monitoring and further research in the attributes of Harlequin duck breeding and rearing habitat. Environment Canada advised the Panel that, in its view, the current application by CRC did not adequately address the cumulative effects of the proposal with respect to Harlequin ducks and that, without design alterations, Harlequin duck populations would be impacted.

The AWA Coalition indicated that, in its view, CRC had failed to adequately address potential impacts of the Cheviot Coal Project on Harlequin ducks. Relevant issues included missing information on: the appropriateness of the proposed mitigative measures; the size of populations to be affected and the timing of these affects; the loss of biodiversity; and the impacts of habitat fragmentation. The AWA Coalition believed that CRC, rather than providing the above data prior to requesting approval, proposed to collect the information needed to properly design a mitigation and reclamation plan only after it had received approval. This, they stated, was inconsistent with the EIA Terms of Reference.

The AWA Coalition noted that CRC had made no commitment to carry out any of the mitigation strategies described in the EIA. Nor had CRC, in its view, carried out a CEA for Harlequins. They noted that CRC's contention of only relatively short–term impacts was highly unlikely, but rather would be at least between 20 years (the life of the mine) and 35–45 years (the time needed to restore riparian habitat) in duration. Since, in its view, CRC had not made an adequate commitment to restore riparian vegetation, such impacts could in fact be of even longer duration. Furthermore, the AWA Coalition noted that mitigation of the impacts of development would only occur if other breeding birds were available and willing to re-colonize the area, an assumption which they believed could not be supported by CRC's application. Finally, AWA pointed out that AEP was currently reviewing the status of the Harlequin duck in Alberta and, given recent information, they were relatively sure its status would be changed to a higher risk category.

In its submission, AEP advised the Panel that it was prepared to accept CRC's analysis of the current status of the Harlequin duck and the potential impacts of mine development. AEP also confirmed that it is currently reviewing the status of the Harlequin in Alberta. AEP indicated that, given the species' sensitivity and its apparent density within the region, it was prepared to accept CRC's proposed inventory and mitigation programs. AEP indicated that CRC would, prior to receiving AEP approvals, need to:

- complete the proposed Harlequin inventory, and identify critical habitat;
- identify and assess the impacts of the current mine design;
- identify and assess the effectiveness of mitigation strategies;
- consider alterations needed in the mine design to protect Harlequin habitat; and
- in consultation with AEP, design and report the results of monitoring programs on the effectiveness of the mitigation strategies.

During its cross-examination of Environment Canada, the Alpine Club Coalition noted that some nesting of Harlequin ducks had been observed in Prospect Creek and suggested that avoidance of mining in that drainage would be of benefit to the species.

4.6.3 Views of the Panel

The Panel notes that all parties to the hearing agreed that the Harlequin duck, given its relatively unique habitat requirements for nesting and brood rearing, plus its fidelity to specific areas, makes it an excellent indicator of general habitat quality, and presumably, of the ability of a project proponent to mitigate affects on that quality.

In considering the potential impacts on the Harlequin duck, the Panel believes that the research to date by CRC has been adequate to describe the general distribution of these birds in the area as well as provide a reasonable indication of their use, both temporally and spatially, of that habitat. The Panel also believes that the Cheviot Coal Project, as proposed, will have a significant and permanent adverse effect on certain portions of that habitat, namely those creeks which are filled with waste rock. Furthermore, various aspects of the project (e.g. road and rail construction, culverts) will at best temporarily disturb adult birds and their broods and at worst potentially make other stream sections unavailable to the Harlequins for at least the duration of the Cheviot Coal Project.

Unfortunately, there is not a significant amount of information available regarding the relative sensitivity of Harlequins to disturbance. The Panel notes that two Alberta populations, on the Elbow and Maligne Rivers, appear to have been impacted by recreational use of those rivers. However, these effects on flightless broods of very young ducks, who depend on the rivers to provide escape habitat, is not unexpected. The Panel does believe that the sources of disturbance from development of the Cheviot Coal Project would likely be of a quite different nature (i.e. on shore, localized) and so not directly comparable. The Panel also notes that the upper McLeod River was heavily disturbed by mining activity for several decades. The presence of nesting Harlequins there now strongly suggests that either the birds were able to adapt to human presence or alternatively, were able to re–colonize the area once disturbance ended.

The Panel accepts the view of Environment Canada that, in assessing the potential significance of a reduction in the McLeod River Harlequin population, it is necessary to look in a broader context to the population as a whole. In doing so, the Panel believes a number of points need to be considered. First, it was generally accepted by all parties that there are between 160 000 and 200 000 Harlequins located in western North America. Even if only a relatively small proportion of these birds are breeding, then it appears reasonable to assume that several thousand breeding pairs exist. Therefore, while a reduction in the McLeod River population may be of local, regional, or even provincial significance, and while the Panel can understand Environment Canada's desire to avoid any source of incremental loss to the breeding population, the Panel does not believe that it is appropriate to consider such losses to be significant in terms of the species as a whole.

Second, on a regional basis, it was suggested that the McLeod River population was very

significant since it represented the second largest concentration of breeding birds found to date in Alberta. The Panel does accept that the McLeod River population is regionally important. What is not yet clear is to what degree the relative size of this population, when compared to other provincial populations, is a function of the level of effort made to carry out surveys. The Panel notes that estimates made in 1995 apparently underestimated the population size by 50 per cent, not a surprising result given the secretive nature of the birds. The Panel is persuaded that other mountain and foothills streams also likely have Harlequin populations, but have simply not been systematically surveyed to anywhere near the degree of intensity that has occurred in the McLeod River system.

Based on the above, the Panel does not believe that the effects on regional Harlequin duck populations during the life of the mine would be sufficiently large as to be unacceptable. The Panel accepts that some reductions in the current size of the breeding population within the area to be disturbed by mine development will occur, and furthermore, there is a significant risk that the population may not recover to its current size due to the permanent loss of some habitat. The Panel also believes, however, that a number of sources of impact during the life of the mine can be reduced or mitigated and that, following mining activity, there is a reasonable probability that re–colonization of at least some area streams by Harlequin ducks will occur. As a result, the Panel does not believe that the adverse environmental effects on Harlequin ducks will be significant.

With regard to mitigation, the Panel believes that the mitigation strategies described by CRC are reasonable and, to the degree practical, will require that they are implemented should the Cheviot Coal Project be approved. These requirements will include:

(1) avoiding placing any unnecessary construction activities (e.g. staging areas, borrow pits, etc) in proximity to the main stem of the McLeod River and MacKenzie Creek;

(2) planning of construction activities around sensitive periods;

(3) maximizing setbacks from the McLeod River, MacKenzie Creek, and the Cardinal River systems wherever possible;

(4) re–examining the use of culverts and either substituting bridges or providing a detailed rationale for the retention of culverts; and

(5) timing of flow release patterns to the degree possible to mimic natural patterns and levels.

The Panel is not prepared to require CRC to relocate either the rail loop or the coal processing plant to reduce potential impacts on Harlequin ducks. The Panel notes that the site chosen by CRC represented a complex balance between a number of conflicting environmental, social, and engineering issues, and is not persuaded that the possible reduction in effects on Harlequin ducks is sufficient to require that CRC re–examine the tradeoffs already made.

The Panel also believes that ongoing monitoring of Harlequin duck populations in the McLeod River, MacKenzie Creek, and Cardinal River systems is warranted. As noted earlier, the species

appears to be an excellent indicator of general ecosystem health, and so will provide a measure of CRC's success in avoiding disturbance to riparian habitat in general. Further inventories of area streams will also assist CRC in identifying additional key habitats for the species.

Finally, the Panel notes that reducing further human access to the Cardinal River and the McLeod River and avoiding new access to MacKenzie Creek may also reduce impacts to Harlequin ducks. However, such decisions need to be made as components of integrated land planning, and the responsibility of AEP and not CRC. Therefore, the Panel suggests CRC work in conjunction with AEP in assessing any issues associated with access to these drainages.

4.7 Neotropical and Other Breeding Birds and Raptors

4.7.1 Views of the Applicant

Study Area

In assessing potential impacts on neotropical and other smaller birds arising from the Cheviot Coal Project, CRC carried out breeding bird surveys in 1993 and 1994. Eighty plots were sampled in 1993 and 42 sampled in 1994. Plots were primarily located within the mine permit boundary, but also extended down both the McLeod River and MacKenzie Creek drainages. Owl surveys were carried out over 77 kms of trails and roads throughout the general area of the mine, while surveys of diurnal raptors focused on cliffs near the headwaters of Prospect, Cheviot, and Thornton Creeks, and along Cardinal Divide.

Existing Conditions

Neotropical migrants are those birds which breed in Canada and the United States, and generally winter between the Tropics of Cancer and Capricorn. CRC noted that many of these species have been declining within their breeding ranges over a prolonged period. Since western populations breed primarily in limited riparian and montane forests, CRC observed that they may be particularly vulnerable to disturbance. Forty–four of the 76 bird species recorded by CRC within the region of the Cheviot mine were neotropical migrants.

Bird densities at Cheviot were slightly higher than at Coal Valley and significantly higher than the Luscar mine. On the mine site, shrub habitat supported the highest density of birds, while coniferous habitat had the lowest bird density. Density also increased with increases in proportions of shrub and edge in vegetative communities, while diversity was positively correlated with increased structural (i.e. horizontal and vertical) diversity.

Seven diurnal raptor species and two owl species were observed by CRC. A possible siting of either a peregrine or prairie falcon was also noted. Some (e.g. golden eagles, northern harriers, rough–legged hawks) were thought likely to be migrants, while others (e.g. American kestrel, red–tailed hawk, sharp–shinned hawk, osprey) may nest in the area or nearby, although no nests were observed. A single great horned owl and several boreal owls were recorded during winter bird surveys, and boreal owls were common along both the Cardinal River and MacKenzie Creek during the summer months.

Expected Effects

In its assessment of the impacts on neotropical birds, CRC did not specifically distinguish between the various project components. CRC did predict that the primary source of impacts on neotropicals and other breeding birds will result from vegetation removal during both the construction and mining phases of the Cheviot Coal Project. Both direct mortality and indirect impacts from loss of breeding habitat would occur. During the reclamation process, shifts in bird community distribution would also result due to changes in the vegetative community composition.

CRC expected that raptor populations would be affected through both direct mortality of adults (e.g. electrocution or collisions) and direct mortality of eggs or young (e.g. removal of active nest sites). Less direct impacts could include the loss of tree cover, nesting areas, or prey habitat, as well as sensory disturbance from blasting or similar activities.

In order to mitigate these impacts, CRC advised that it would consider a number of options during detailed planning. These included: clearing of vegetation outside of the breeding season; maintaining as much undisturbed vegetation as possible; removal of carrion from roads as soon as possible to avoid scavenging and the associated risk of collisions; and reclaiming the returned mine site to as diverse a vegetative community as practical.

CRC concluded that there were no significant cumulative effects expected on either neotropicals or raptors.

4.7.2 Views of the Interveners

In Environment Canada's view, development of the Cheviot Coal Project would greatly reduce the biodiversity of habitat types within the area. This, in turn, would have an impact on a number of species and particularly bird species. Environment Canada observed that the area had a notably high number of bird species, many of which are showing generally declining numbers and/or which have restricted ranges and special habitat requirements. Environment Canada also noted the relative importance of riparian and shrubland habitats, two relatively common features of the mine area, to bird species. Much of this habitat would, in its view, be lost or damaged under CRC's current mine plan. In order to mitigate some of these effects, Environment Canada recommended that no vegetation clearing in areas where migratory birds are nesting take place between 1 May and at least 21 July. It was also recommended that all mine plans be reconfigured so as to minimize habitat loss, particularly riparian and shrub habitat, and to provide 100 m buffers on both sides of all streams from disturbance.

The AWA Coalition found the treatment of various bird species in the EIA "uneven". For example, colonization by neotropical birds was discussed while colonization by raptors was not. The AWA Coalition also believed that the CRC application had underplayed the significance of riparian habitats, as well as not clearly indicating that the two most common habitat types on the site (i.e. riparian and spruce forest) will be under–represented once final reclamation is complete. Populations dependent on these vegetation types would, therefore, be negatively affected

permanently.

4.7.3 Views of the Panel

The Panel notes the research carried out by CRC within the proposed Cheviot mine region and is prepared to accept the company's views with regard to existing populations of neotropical birds and raptors. The Panel is also prepared to accept Environment Canada's view that the diversity of bird species within the Cheviot region is high relative to other regions.

The Panel would agree with CRC that, as vegetation is removed from mine development, habitat will become completely unavailable for nesting birds. Furthermore, human activity and noise will likely extend those effects further than the area immediately disturbed. Such habitat will not become available again until re–vegetation is completed. The Panel also accepts that the original species' diversity in the area will not likely return until vegetative diversity is also re–established. As a result, impacts will begin relatively early in the project and extend several decades beyond the final reclamation of the mine. If the final reclaimed landscapes, due to the use of rock drains, are significantly drier than what currently occurs within mine areas, then some permanent loss of riparian shrub habitat, and therefore numbers of birds, may also occur.

The Panel notes and accepts that many bird species, and particularly neotropicals, are losing available habitat at a significant rate. Therefore, any further loss of habitat, particularly in cases such as the Cheviot Coal Project where such habitat is of relatively limited distribution, should be avoided to the extent possible. In this particular case, there is little doubt that development of the Cheviot Coal Project will have a significant adverse effect on local bird populations in general and neotropicals in particular. The Panel also believes that, despite CRC's commitment to the reclamation and revegetation of the site, these effects will be relatively long term. The Panel does believe that much, if not all, of the current species diversity within the mine area can ultimately be re–established.

In order to further mitigate these effects, the Panel will require CRC, should the Cheviot Coal Project be approved, to attempt to restrict vegetative clearing to periods outside the breeding season and to make the maximization of habitat diversity a key component of its reclamation plans. Removal of carrion from the roads will also be encouraged to reduce raptor mortality. Such actions should, in the Panel's view, ensure that impacts on song birds and raptors will be reduced and justifiable in the overall circumstance, and that both the risk of longer term and cumulative effects are lowered to acceptable levels.

5 ATMOSPHERIC ENVIRONMENTAL EFFECTS

5.1 Noise and Vibration

5.1.1 Views of the Applicant

Study Area

CRC indicated that it had considered existing levels of noise within the area to be affected by mine development and the coal processing plant, as well as along the access corridor. At the hearing, the possible effects of noise within Jasper National Park was also evaluated.

Existing Conditions

CRC noted that no permanent or temporary residences are present either within or near the proposed surface mine and coal processing plant areas. Existing sources of man–made noise were traffic related, either on the Grave Flats Road or from off–highway vehicles.

The nearest residences are found within the Hamlet of Cadomin. Existing noise sources include the Inland Cement plant, the Luscar mine, and the rail and road traffic associated with both developments. CRC noted that anyone using the Whitehorse Creek Recreational Area would also be exposed, albeit to a lesser degree, to these noise sources plus any general road traffic. No temporary or permanent residences currently exist on the Alexis First Nation lands.

Expected Effects

CRC advised that, because of the distances involved, the noise levels from both the mine and the coal processing plant would meet the EUB requirements of less than 40 dBA Leq at the nearest residence (i.e. Cadomin), and therefore no effects from mine and coal processing operations on either the Hamlet of Cadomin or the Whitehorse Creek Recreational Area were predicted.

CRC said that it expected increased noise levels with respect to the Alexis First Nation lands, which are presently unoccupied, but that these levels would also be no greater than 40 dBA Leq and would occur only when the mining operations approached close to the Alexis First Nation lands.

CRC noted that during development of the 50–A–8 pit at the Luscar mine, it had implemented a number of procedures which had further reduced noise levels associated with mining operations. If conditions warranted, and provided other issues such as worker and public safety could be addressed, CRC indicated that it would be prepared to consider such procedures at the Cheviot Coal Project.

With respect to the transportation and utilities corridor in the McLeod River valley, CRC noted that there was some potential for noise impacts on the community of Cadomin; however, changes in train make–up and the introduction of sight and sound barriers with respect to the Cadomin bypass road should minimize these impacts. Under cross–examination, CRC advised that a noise

evaluation study had not been conducted with respect to the final route of the bypass road, but expected that increases in noise level could be mitigated with berms and/or barriers. CRC said that any elevated noise levels from train traffic through Cadomin would be mitigated by the decrease in traffic to the Luscar mine and by more efficient handling of the Inland Cement rail traffic. With respect to the Whitehorse Creek Recreational Area, CRC advised that the anticipated noise exposure, while elevated above the levels existing at present, would be comparable to other area recreational sites. Vibrations from trains were considered as being virtually undetectable from present background conditions.

During the hearing, and in response to cross-examination, CRC provided an assessment of the anticipated noise levels which could be expected in Jasper National Park. This assessment indicated, in CRC's view, that the EUB goals for sound levels in pristine areas (i.e. less than 40 dBA Leq at 1.5 km from the sound source) would be achieved.

CRC referred to a 1989 study it had conducted with regard to the potential for impacts of blast vibration on the Cadomin Caves. This study was carried out in relation to the Luscar 50–A–8 mining operation. Subsequent monitoring had shown that vibrations due to its operations in the 50–A–8 area are not detectable at the mouth of the Cadomin Caves. Given that the Cheviot Coal Project would be even further from the Caves than the 50–A–8 operations, CRC concluded that impacts on the Cadomin Caves would be negligible.

Following evaluation of the anticipated noise levels associated with the project, CRC concluded that noise and vibration were not significant environmental issues, that long–term monitoring of noise was not considered to be necessary, and that noise levels were expected to comply with the EUB guidelines.

CRC expressed the opinion that there were no cumulative effects resulting from noise and vibration associated with the project.

5.1.2 Views of the Interveners

CEPA said that it had retained its own consultant with respect to the Cadomin road options and that the consultant had concluded the traffic generated by the project could be expected to double if the Cheviot Coal Project goes ahead. It noted that the present posted speed limit through the community was 50 km/hr and that the traffic was reasonably unintrusive on the quality of life of the residents. CEPA felt that all possible steps should be taken to mitigate the impacts of noise on the community, and therefore believed that the bypass road should be paved from the northern to the southern boundary of the Hamlet.

Parks Canada and the AWA Coalition expressed concern for the potential for noise impacts in Jasper National Park. However, in cross-examination, Parks Canada agreed that there were no documented complaints received to date in relation to the existing Luscar mine operations.

Both the AWA Coalition and the Alpine Club Coalition questioned the potential for noise impacts in the Cardinal Divide Natural Area. They noted that the EUB Noise Control Directive (ID 94–4) required companies in remote areas to achieve 40 dBA Leq at a distance of 1.5 km

from the facility. In their view, CRC would be unable to achieve this at the Cardinal Divide Natural Area. The Alpine Club Coalition believed that further noise studies by CRC were warranted.

5.1.3 Views of the Panel

The Panel accepts the results of the noise study conducted on behalf of CRC; however, it notes that the requirements of the EUB's ID 94-4 may have received too narrow an interpretation by the company in their application to the various components of the project. Should the project be approved, the Panel will require that, prior to any construction work being started, CRC establish Permissable Noise Levels (as defined by ID 94-4) with respect to residences in the Hamlet of Cadomin and the Whitehorse Creek Recreational Area. Such a step would provide criteria from which any future noise complaints could be assessed.

The Panel does not agree with CRC's view that noise resulting from rail or road traffic generated by the Cheviot Coal Project is beyond the purview of the EUB. These activities are, in fact, integral to CRC's application for approval to the EUB. Therefore, should these activities result in noise levels unacceptable to the residents of Cadomin, CRC will be required to take any steps deemed appropriate by the EUB to reduce these levels.

With respect to noise levels at the Cardinal Divide Natural Area, the Panel notes that CRC's activities will almost undoubtedly be audible. However, just as CRC has placed too narrow an interpretation on the EUB's noise control guidelines, the Panel believes that the interveners' interpretation may be too broad. The Panel notes that the EUB's noise control requirements are designed to ensure that sound levels are minimized in remote areas in order to ensure that, should a residence be established at some future time, conflicts can be minimized. The Directive does not address noise impacts on temporary users of the land and, in fact, does not even guarantee that a permanent resident will not be able to hear the new facility, but rather only that indoor sound levels will not be affected. The Panel believes that, while sounds from the Cheviot Coal Project would not go unnoticed in a wilderness setting, the noise impacts on Jasper National Park and the Cardinal Divide Natural Area will not be significant. However, the Panel will require CRC to consult with both Parks Canada and the Alpine Club Coalition should noise complaints arise and, wherever possible, look for feasible methods to reduce impacts.

The Panel agrees with CRC's conclusions that negligible blasting impacts on the Cadomin Caves from development of the Cheviot Coal Project are likely. However, given the potential sensitivity of the Caves' ecological resources, the Panel will require, if the application is approved, that CRC evaluate with EUB staff whether any additional noise follow up or monitoring prior to start up is appropriate.

5.2 Emissions

5.2.1 Views of the Applicant

Study Area

Local, regional, and global emission issues were addressed by CRC. Local boundaries were felt to extend to the Whitehorse Creek Recreational Area, the residential areas of Cadomin, the Smallboy Camp, and the Alexis First Nation lands. Regional impacts on Jasper National Park (visibility) and on the West Central Airshed, established by AEP, were also addressed by CRC, as were the potential global effects of the project due to greenhouse gas emissions.

Existing Conditions

Meteorological data used by CRC included data from the current Luscar mine monitoring network (from 1991) and a monitoring station established at the former townsite of Mountain Park (from 1993). Particulate data were collected at stations in proximity to Cadomin.

North–west, west, and north winds predominated and wind speeds were less than 5 m/s 89 per cent of the time. Inversions were found to occur 38 per cent of the time. Mean annual total suspended particulate levels were 22 $\mu g/m^3$, while 24 hour maximum average values were 109 $\mu g/m^3$. While the latter was slightly above AEP guidelines, the levels were not considered indicative of either public health or environmental concerns. Measured levels of annual and maximum fine particulates were 7.5–11 $\mu g/m^3$ and 38–49 $\mu g/m^3$, respectively and were considered to be low, representing good air quality.

Expected Effects

CRC stated that it planned to have much of the coal preparation plant totally enclosed and that it intended to install dust control systems at various dust–generating locations and totally enclose all external conveyors. The proposed emission limits for the coal dryer, it advised, would be based on a best available control technology (BACT) evaluation and would compare very favourably with other plants in Canada and the United States. CRC expected to reduce particulate emissions to about 30 per cent of the maximum limit permitted by AEP for exhaust gas. CRC said that outside storage of coal, and therefore associated dust, would be reduced by providing four large coal silos (compared with one silo at the existing Luscar mine site). Other emission levels (e.g. oxides of nitrogen) would, in CRC's view, be negligible. With respect to its predictions of the ambient air quality which could be expected as a result of the Cheviot Coal Project, CRC advised that it had used a dispersion model developed by the U.S. Environmental Protection Agency. This model, CRC noted, had been accepted by both AEP and Environment Canada.

CRC indicated that it intended to use surfactants on the gravel surface of the proposed upgraded Grave Flats Road for dust control and continue the practice of applying water to the mine's haul roads currently used at the Luscar mine. CRC noted that local nuisance dusting may occur in the vicinity of both the cemetery and of the former townsite of Mountain Park, but that no health

effects are anticipated because of the relatively short exposure times which would be incurred by visitors to these areas. CRC also noted that dust sources from the existing Luscar mine would decline as that mine reached the end of its economic life, and so reduce regional loadings.

CRC said that, based on its modelling, regional air quality in the West Central Alberta Airshed would not be significantly affected by the project, and that visibility in Jasper National Park would also be unaffected. As the Cheviot Coal Project was a replacement for the Luscar mine, CRC also expressed the opinion that there would be no significant new contributions to global warming. At the hearing, CRC also indicated that it did not expect significant emissions of PAHs from its tailings pond due to diesel fuel carryover, since the vast majority of the material would adhere to the clean coal.

CRC concluded that the results of its studies suggested that the impacts from dust and gaseous emissions during the construction and operation phases would be insignificant, that there would be no significant effects on ambient air quality or public health, and that there would be no cumulative effects in respect of air quality associated with the project.

5.2.2 Views of the Interveners

The Mountain Park Association expressed a concern that fish in the area could ingest coal dust, and questioned whether such fish could be safely eaten. A similar concern was expressed by Health Canada, who speculated whether human exposure to coal dust and subsequently to PAHs could occur directly from the consumption of contaminated vegetation or indirectly from the consumption of wildlife or fish harvested from the area.

CEPA stated that, notwithstanding CRC's proposed use of calcium chloride on the bypass road, it continued to have reservations that this was sufficient to control dust adequately, and felt that paving of the bypass was the answer to its concerns for dust impacts on the community.

The Alpine Club Coalition expressed concern regarding the potential for dust emissions on rare plants within the Cardinal Divide Natural Area and rare plants located in the area along the transportation and utilities corridor.

The AWA Coalition raised several concerns regarding potential emissions from the Cheviot Coal Project. They argued that dust plumes and haze will be visible from some considerable distance, and could impair the natural vista. Further, these effects will increase as mine development expands. They felt that CRC had also not considered the impacts of particulates on alpine vegetation in either the Cardinal Divide Natural Area or Jasper National Park, particularly on lichens which receive a significant portion of their nutrients from atmospheric deposition. The AWA Coalition also believed that CRC had not adequately addressed the impacts of particulates on human health, claiming that CRC's current sampling frequency may be inadequate, that CRC had not considered the cumulative effects of both the Luscar mine and the Cheviot mine, and that CRC should sample for particulates in communities other than Cadomin. Finally, the AWA Coalition stated that they believed CRC's dispersion models were inaccurate.

The AWA Coalition also raised concerns regarding volatile organic carbon (VOC) and nitrogen

oxide (NO_x) emissions from the mine. In particular, either direct impacts from these compounds, or indirect effects due to the formation of ozone, were predicted on sensitive plant and animal communities. PAH and BTEX (benzene, toluene, ethylbenzene, and xylene) were also considered to be compounds of concern in emissions from the Cheviot Coal Project. In their view, CRC failed to adequately quantify NO_x or VOC emissions from the Cheviot Coal Project or to adequately describe the cumulative impact of ground level ozone in the West Central Airshed.

Finally, the AWA Coalition noted that Canada had made an undertaking to reduce its national emissions of greenhouse gases, and particularly CO_2, to 1990 levels by the year 2000. In their view, this commitment was reconfirmed by the government, and that significant steps would need to be implemented to meet this goal. The AWA Coalition argued that approval of a project designed to produce large volumes of hydrocarbon, and therefore CO_2, was inconsistent with federal policy. Alternatively, approval of the Cheviot Coal Project would require foregoing or curtailment of other, potentially more economic, future developments in order to meet the federal commitments.

The AWA Coalition noted that, in their view, CRC had not adequately addressed the impacts of methane emissions from the Cheviot Coal Project on global warming. This was important, they stated, because methane has 21 times the global warming impact of CO_2. Nor did CRC adequately address, in their view, the emissions of global warming gases associated with plant operations (e.g. thermal dryers, space heating, fuel consumption, electrical power, etc). Finally, the AWA Coalition noted that CRC had not yet provided any evidence that CRC was an active participant in Canada's Climate Change Voluntary Challenge and Registry Program.

Health Canada advised the Panel that no data on potential health effects associated with surface coal mining appeared to be available, and indicated it would be prepared to participate in such a study. The Alexis First Nation noted that it had issues similar to those raised by Health Canada, since its community members actively hunt animals in the area for food. They stated that they wished to be assured that airborne emissions were not contaminating area food sources.

5.2.3 Views of the Panel

Despite the concerns raised by some participants to the hearing, the Panel did not find the evidence of risk to plants, animals, or humans from emissions from the Cheviot Coal Project to be compelling. The Panel believes that no evidence was provided which would suggest that impacts on ambient air quality or public health will occur or be significant. The Panel also believes that there will be no cumulative effects, as a result of emissions, from the proposed project. In reaching this conclusion, the Panel notes that, in general, the emission sources of VOC, NO_x, BTEX, and PAH from a surface mine would appear to be significantly smaller than from many other industrial facilities. The Panel also notes that neither AEP nor Environment Canada expressed any concerns in their submissions with regard to emissions.

The Panel does believe that the concerns raised by CEPA regarding dust within the Hamlet of Cadomin warrant further consideration. The Panel notes that, in a previously considered Cadomin bypass proposal, CRC had indicated that it was prepared to pave the Cadomin bypass

section of the upgraded Graves Flats Road. However, the Panel understands that CRC no longer considers it necessary to pave the most recent bypass alternative since it would be located some distance away from the Hamlet. The Panel believes, however, that in view of concerns with respect to dust in relation to the proposed Cadomin bypass, paving of this section (i.e. from the northern boundary of the Hamlet to its southern boundary) is very likely still appropriate. Should the project be approved, the Panel will expect CRC to discuss this issue further with the municipal authorities and with the community and, in the absence of concerns from either party or safety issues, ensure that this road section is paved.

With regard to the emissions of greenhouse gases, the Panel notes that the Cheviot Coal Project would, if approved, within two to three years replace mining activities at the existing Luscar mine. While the new mine will have higher production rates and therefore greater sources of greenhouse gas emissions, this will be offset somewhat by higher energy efficiency at the new mine. Therefore, the Panel does not believe that approval of the Cheviot Coal Project will result in a significant change in regional emissions of greenhouse gases.

The Panel accepts that, if Canada ultimately does determine that specific caps to greenhouse gas emissions from industry sources should be put in place, there will be some, although likely small, level of risk that a decision by this Panel to approve the Cheviot Coal Project may have an affect on the overall implementation of such a program. However, to the Panel's knowledge, no such program currently exists.

6 LAND USE EFFECTS

The proposed Cheviot Coal Project is located on lands owned by the Province of Alberta (i.e. Crown lands) and is subject to government land use policies. A number of other uses are currently made of these and nearby lands, including: provincial natural areas, recreational uses, commercial developments, and federal national parks. (A number of communities are also located near to the Cheviot Coal Project. The expected environmental effects of the Cheviot Coal Project on them are discussed in Section 7 of the report.)

6.1 Land Use Policies

6.1.1 Views of the Applicant

In their application, CRC acknowledged that several provincial zoning policies cover the proposed development areas of the Cheviot mine, including the Coal Development Policy for Alberta, the Eastern Slopes Policy, and the Coal Branch Sub-Regional Integrated Resource Plan.

CRC also noted that the proposed Cheviot Coal Project area is located entirely within the Municipal District (M.D.) of Yellowhead No. 94. The applicant indicated that, should the project be approved by the provincial and federal governments, local development approvals would also be required and would be subject to the development policies of the M.D.

Coal Development Policy

CRC noted that the 1976 Alberta Coal Development Policy identifed a variety of categories which set out the extent to which exploration and development of coal resources may be considered in Alberta. The categories are based on factors such as potential coal resources, infrastructure requirements, alternate land uses, environmental sensitivity, and reclamation capability.

At the hearing, CRC advised the Panel that all lands within the mine permit area were classified under the Coal Conservation Act as Category 4 lands; that is, lands:

> ***"in which surface or underground mining or in-situ operations may be considered subject to proper assurances respecting protection of the environment and reclamation of disturbed lands".***

CRC stated that the Coal Development Policy zoning for the proposed Cheviot area recognizes the previous mining activity in the area, as well as the high potential for the area to still contain significant coal resources, the proximity of infrastructure, the presence of successful coal operations, and reclamation achievements in the immediate area. In CRC's view, these all confirm the capability of the area to accommodate future coal mining.

Coal Branch Sub-Regional Integrated Resource Plan

CRC stated that the 1995 Coal Branch Sub-Regional Integrated Resource Plan outlined the

government's most recent general resource management policy for public lands and resources within the Coal Branch planning area. CRC stated that the Integrated Resource Plan identified eight Resource Management Areas (RMAs) within the Coal Branch Region and that the Cheviot project area is within the Mountain Park–Folding Mountain RMA. CRC observed that the Integrated Resource Plan (page 66) stated that:

> ***"The management intent for the Mountain Park–Folding Mountain RMA is to recognize a varied range of provincially significant resources such as coal, wildlife, extensive recreation, tourism and historical resources. A limited range of other multiple use activities will also be provided, while recognizing the importance of watershed protection."***

CRC indicated that four land use zones and their associated objectives have been established for the immediate area within and around the Cheviot Coal Project. These are:

- ***Zone 1 - Prime Protection**: "To preserve environmentally sensitive terrain and valuable ecological and aesthetic resources."*

- ***Zone 2 - Critical Wildlife**: "To protect specific fish and wildlife populations by protecting aquatic and terrestrial habitat crucial to the maintenance of those populations."*

- ***Zone 4 - General Recreation**: "To retain a variety of natural environments within which a wide range of outdoor recreation opportunities may be provided."*

- ***Zone 5 - Multiple Use**: "To provide for the management and development of the full range of available resources, while meeting long-term objectives for watershed management and environmental protection."*

Of these, CRC noted that only Zones 2, 4, and 5 are found within the lands to be disturbed by the Cheviot Coal Project. CRC stated that while Zone 1 (Prime Protection) lands border part of the Cheviot Coal Project area, they do not occur within it and that the breakdown of the land use zones within the project is: 83 per cent Critical Wildlife; 8 per cent General Recreation; and 9 per cent Multiple Use.

Coal Branch Access Management Plan

CRC indicated that the Coal Branch Access Management Plan, which was developed in 1995, also had a bearing on the Cheviot Coal Project. CRC stated that the Access Management Plan was intended to manage motorized and non-motorized recreational use on existing access routes on public land. The Plan was created in order to provide opportunities for compatible motorized and non–motorized recreational use, while meeting the fish and wildlife objectives and maintaining the integrity of the natural environment as outlined in the Integrated Resource Plan. Within the Mountain Park–Folding Mountain RMA, the planning area considered by the Access Management Plan included all Zone 1, 2, and 4 areas. To date, the plan has only been implemented on a voluntary basis, with a public review proposed for the latter half of 1997.

CRC stated that the proposed mine and coal preparation plant operations would disturb portions of designated motorized access corridors from the project area to Drummond/Prospect Ridge and to Cadomin Ridge/Cadomin Mountain. CRC stated that it was prepared to work with provincial land managers and affected stakeholders to review access alternatives and, where appropriate, develop trails outside the disturbance area, and thereby provide linkages to the existing trail system. In addition, CRC stated that it would prepare annual access plans within the project area that would be available for review by interested recreation user groups. As a result, CRC believed that the proposed Cheviot Coal Project would have an insignificant impact on the Coal Branch Access Management Plan.

Special Places 2000

In their application, CRC noted that Special Places 2000 is a 1995 government policy committed to the identification and protection of a network of natural landscapes that represent the environmental diversity of the province's six natural regions and 20 sub–regions. CRC noted at the hearing that the Alberta Minister of Environment had advised the Special Places Coordinating Committee that the Cardinal Divide Natural Area is an effective and adequate commitment to the protected areas program for this portion of the Rocky Mountains. CRC stated that, in its view, approval of the Cheviot Coal Project would have no impact on the Special Places 2000 program.

CRC stated that, while it was aware that there are other land use policies which may have some degree of relevance to the Cheviot Coal Project, it was their belief that the policies noted above were the overriding authority for the area. Furthermore, CRC stated that whatever land use limitations may have previously applied to the Cheviot Coal Project under the 1984 Eastern Slopes Policy, those had now been superseded by the more recent Integrated Resource Plan.

CRC stated that it recognized that zoning policies carry restrictions and/or guidelines for industrial development within the areas of their coverage and hence must be assessed for potential conflicts or development conditions. CRC stated that it had incorporated what it interpreted as being the required components of the aforementioned policies into its EIA.

6.1.2 Views of the Interveners

The AWA Coalition stated that they believed the applicant had not given an appropriate amount of consideration to all of the relevant policies that apply to the proposed Cheviot project area. The AWA Coalition also felt that, due to the possibility of impacts extending beyond the proposed project boundary, the policies which apply to lands adjacent to the proposed project area should also have been considered.

The AWA Coalition stated that, in its view, CRC was prepared to meet only the basic statutory requirements, which included such policies as the Coal Branch Integrated Resource Plan, the Coal Development Policy for Alberta, and the Coal Branch Access Management Plan. It was the contention of the AWA Coalition that CRC had not addressed all of the relevant policies and, of the ones that it had addressed, CRC had not satisfactorily presented evidence that indicated it would be able to meet their intent and/or goals. As an example, the AWA Coalition noted that

the Coal Development Policy states that any coal development which will cause irreparable harm to the environment should not be approved. The AWA Coalition stated that there was extensive expert evidence concluding that irreparable harm to the environment, including to such VECs as grizzly bears, Harlequin ducks, migratory song birds, rare plants, and fish will occur if the Cheviot Coal Project were to proceed.

The AWA Coalition also suggested that the Cheviot area had been classified as Zone 2 (i.e. Critical Wildlife) rather than Zone 1 (Prime Protection) during the creation of the Integrated Resource Plan because coal leases already existed for the area, rather than as an accurate measure of the relative environmental sensitivity of the lands. However, since such zoning did not guarantee a company that a proposed development would be approved, the AWA Coalition stated that it had now fallen to the Panel to determine whether the application was compatible with the intent of the Integrated Resource Plan. The AWA Coalition also stated that since, in their view, portions of the Cheviot mine permit area, most notably upper Prospect Creek, were still being considered as potential extensions to the Cardinal Divide Natural Area under the Special Places 2000 program, CRC could not claim that the approval of the Cheviot Coal Project would have no impact on Special Places 2000.

RMEC also stated that, in its view, CRC had considered only those policies which favoured its project and had ignored those which did not, often arguing that policies did not have the force of law. Further, RMEC concurred with the AWA Coalition's position that policies are a key determinant as to the significance of an environmental effect, and therefore go considerably towards establishing what the public interest is in a particular situation. Given this, RMEC felt that the question of significance of impacts must be viewed beyond just legalistic terms and that policy is one of many components which must be considered in the decision–making process.

AEP advised the Panel that, in its view, the proposed Cheviot Coal Project is consistent with the Coal Branch Sub-Regional Integrated Resource Management Plan and that coal mining is a compatible or permitted use within the land use designations for the proposed project area. AEP indicated that it had no objections in principle to a coal mine in this area, subject to public review and approval by the Panel, and subject to CRC meeting all subsequent environmental regulatory requirements.

With respect to the issue of access management, AEP stated that there is a detailed provincial process for the Coal Branch area that already exists which is designed to balance the interests of various stakeholders regarding access management issues. It was indicated by AEP that a determination would be made of the effectiveness of voluntary compliance with the Coal Branch Access Management Plan during the public review in the fall of 1997. At that point, a multi–stakeholder committee, hopefully including CRC, would determine whether the use of legislated forest land use zones (FLUZs) is required or if access management can continue on a voluntary basis. Given this, AEP requested that the Panel leave the issue of access to the provincial process.

6.1.3 Views of the Panel

As noted earlier in this report, the Panel does believe that the consistency of a project with government policy does provide one of many tests of the public acceptability of a project. In the case where there are inconsistencies between the policies themselves, the Panel believes that it is reasonable, unless it can be demonstrated otherwise, to consider either the most recent and/or the most site specific as paramount. In the case of the Cheviot Coal Project, the Coal Branch Sub-Regional Integrated Resource Plan is clearly both the most recent and site specific. That plan also clearly anticipates potential coal mining in the area, to the extent that it sets out specific criteria for an applicant to meet in its environmental planning. The Panel agrees with the position taken by AEP that the Cheviot Coal Project is conceptually consistent with the Integrated Resource Plan for the region. The Panel also finds that the Cheviot Coal Project is consistent with the Alberta Coal Development Policy. Nor is the Panel convinced that further consideration of the area under the Special Places 2000 program is likely.

With regard to access management, this issue has been addressed to some degree previously (Section 4.4) and will be addressed again in Section 6.4. However, the Panel notes that AEP did not raise concerns with CRC's proposals to ensure that Cheviot Coal Project activities were consistent with the Coal Branch Access Management Plan, and accepts that these issues can be addressed during the mine development process.

6.2 Natural Areas

6.2.1 Views of the Applicant

In their application, CRC indicated that two sites near the proposed mine permit area have been designated as Natural Areas, and that two other sites have been nominated as Candidate Natural Areas. The designated Natural Areas were the Cardinal Divide Natural Area south and west of the proposed mine and the Muskiki Lake Natural Area several kilometres to the east. The two candidate sites identified by CRC were the Cadomin Caves Candidate Natural Area located south of Cadomin, and the Grave Flats Candidate Natural Area located 5 km east of the project area. In its application, CRC only addressed possible environmental effects of the Cheviot Coal Project on the Cardinal Divide Natural Area and the Cadomin Caves Candidate Natural Area, as these were the closest to the proposed developments.

Existing Conditions

CRC indicated that the Cardinal Divide Natural Area was established under the Alberta Special Places 2000 legislation in 1995. Bordering part of both the western and southern boundaries of the proposed Cheviot mine project area, it covers approximately 6500 ha and lies between the proposed mine and Jasper National Park to the west and the Cardinal River to the south (Figure 6). CRC also noted that several other areas, notably the upper Cardinal River, upper Prospect Creek, and lands on either side of the point where Grave Flats Road traverses the Divide, had originally been considered for inclusion into the Natural Area. These areas are currently zoned with Protective Notations (PNTs) which are intended to restrict public access to varying degrees.

The Cardinal Divide Natural Area contains a rich variety of physical and biological features, some of which are representative of the alpine ecoregion in the northern front ranges and many of which are special. More specifically, the area contains rock glaciers; waterfalls; numerous rare or geographically significant alpine plant species; and a high diversity of birds, mammals, and insects. CRC recognized that the Cardinal Divide Natural Area is a scenic and fragile area valued for scientific and educational research. The area is easily accessible from the Grave Flats Road and each summer it is visited by a variety of users including hikers, mountain bikers, equestrian trail riders, and off–highway vehicle users.

CRC acknowledged that the Alberta Native Plant Council and the Alpine Club of Canada – Alberta Chapter had volunteered as stewards for the Cardinal Divide Natural Area and the access trails leading to and within this area, while the Alberta Off-Highway Vehicle Association had volunteered to be trail steward for the motorized recreation corridor to the upper Cardinal River.

With regard to the Cadomin Caves Candidate Natural Area, CRC submitted that the Coal Branch Integrated Resource Plan refers to the Cadomin Caves as a historical, biological, and ecological resource and that it has been nominated as a Natural Area under Special Places 2000. CRC described this proposed Natural Area as encompassing approximately 520 ha, including a parking area, an access trail, known passages, predicted cave extensions, cold sulphur springs, and a paleontological site. The area is bounded by the Grave Flats Road on the east and the Whitehorse Creek recreation area to the south. It was recognized by the applicant that the Cadomin Caves are a rare and important feature which have recreational, educational, and interpretive value. As such they are well known by the Alberta Speleological Society and other outdoor recreationalists who visit this region.

Expected Effects

CRC noted that, in general, the proposed Cheviot Coal Project would not affect or encroach upon the Cardinal Divide Natural Area. With the exception of the upper Prospect Creek area, a minimum distance of 1000 m of undisturbed area would be maintained between the mine disturbance and the Natural Area. Some potential risks to the Cardinal Divide Natural Area from revegetation programs and new access (see Section 4) were identified by CRC, but these potential environmental affects were considered to be mitigable.

With regard to the Cadomin Caves Candidate Natural Area, CRC noted that the Cadomin Caves parking area is located 2 km south of the Hamlet of Cadomin and approximately 12 km north of the proposed mine. Potential sources of impacts to the Caves included blasting and the presence of a proposed construction camp and are discussed in Section 3 (groundwater), Section 4 (bats), and Section 5 (noise) of this report. CRC indicated that the Cave entrance is 360 m above the valley floor and estimated that it would take one hour to ascend to the Cave entrance from the parking area. Given this they believed that the potential for the project to have any impact on the Cadomin Caves was insignificant.

6.2.2 Views of the Interveners

The Alpine Club Coalition noted in their intervention that, as stewards of the Cardinal Divide Natural Area, they have a direct interest in the potential impacts of the proposed mine on the Natural Area. The Alpine Club Coalition stated that, unless proper mitigation measures were taken, there was no doubt the proposed mine would have significant and adverse effects on the Cardinal Divide Natural Area.

It was argued by the Alpine Club Coalition that having a relatively undisturbed protected buffer zone between the mine disturbance limits and the Cardinal Divide Natural Area would maintain a valuable core area for wildlife and vegetation. This core area would provide an interim wildlife refuge during mining disturbance, which could ultimately enhance mitigation by allowing for optimal wildlife rehabilitation/re–introduction into the reclaimed areas. Further, the Alpine Club Coalition noted that there were rare and disjunct plant species and plant/animal communities which would be less impacted as a result of such buffers.

The Alpine Club Coalition noted that two parcels of land, section 30-45-23 W5M and the south half of section 27-45-23 W5M had originally been considered for inclusion into the Cardinal Divide Natural Area but, due to the presence of coal leases, had ultimately been excluded. The Alpine Club Coalition observed that CRC no longer intended to mine in these areas and suggested that it would make sense to add these parcels to the Cardinal Divide Natural Area. As noted earlier in this report, the Alpine Club Coalition also suggested that the upper portions of Prospect Creek now also be added into the Natural Area, as had originally been considered. These areas, they noted, contained many plant species of particular concern, as well as provided significant wildlife corridors.

The AWA Coalition also had some concerns regarding both the Cardinal Divide and Cadomin Caves. Due to the proximity of the Cardinal Divide Natural Area to the Cheviot Coal Project surface mine, the AWA Coalition indicated that they were very concerned with CRC's lack of commitment to putting a tree buffer, where possible, between the Natural Area and any vehicle access route. Further, the AWA Coalition did not believe that CRC had provided an adequate commitment that it would not extend the existing buffer zone beyond the boundaries outlined in the proposed mine application.

The AWA Coalition stated that the Cadomin Caves are also provincially significant due to their cultural, biological, and ecological resources. They submitted that the proposed work camp, which may be located in the parking lot at the base of the access trail to the Caves, posed a significant adverse risk to the Natural Area, as did blasting from CRC's construction and mine operations. The AWA Coalition believed that CRC had not adequately committed to any mitigation of impacts to the Cadomin Caves Candidate Natural Area. In particular, they argued that while their preference was to locate the camp elsewhere, at a minimum CRC should implement a security system to prevent access to the Caves during sensitive periods.

AEP, in their final argument, stated that PNTs issued under the Public Lands Act may be revised according to the needs of an area. Specifically, AEP noted that the PNT in the south–west corner of the permit area, within the vicinity of Prospect Creek, could be incorporated into the Cardinal

Divide Natural Area. Inclusion would be dependent upon what portion of the PNT area would be required by CRC's mining operations, should the project be approved, as well as having consideration for other interests in the area.

6.2.3 Views of the Panel

During the course of the hearing, there was a considerable amount of discussion regarding the inter–relationships between the Cardinal Divide Natural Area and the Cheviot Coal Project. These included risks to the area's vegetation resources due to invasion by foreign plants; new access points for vehicles; and loss of aesthetic values due to visual, dust, and noise impacts. Also discussed were the relative values of the ecological resources of the Cardinal Divide Natural Area for the Cheviot Coal Project, including acting as a source of native vegetation and undisturbed wildlife habitat. Finally, the inter–relationships between the upper Prospect Creek area, the mine, and the Natural Area were examined in some detail.

Based on the large amount of evidence presented, the Panel has been able to draw a number of conclusions. First, with regard to the Cardinal Divide Natural Area, the Panel does believe that approval of the Cheviot Coal Project, as applied for, will result in increased pressure on the Natural Area's resources and values. These will come not only from CRC activities but also, and possibly more directly, from recreational users displaced from the proposed mine site (see Section 6.4). However, the Panel believes that, to a large degree, the inclusion of a 1000 m buffer between CRC's active sites and the Natural Area boundaries, plus careful access control, will greatly help to reduce the applicant's direct impacts on the Cardinal Divide. The Panel also believes that other direct impacts, such as risks of invasion of non–native species into the Cardinal Divide, can be adequately controlled. With these mitigative measures in place, the environmental effects of the Cheviot Coal Project on the Cardinal Divide Natural Area would not be significant.

Second, the Panel believes that the Cardinal Divide Natural Area, through its preservation of a substantive block of largely undisturbed habitat to the south of the proposed mine development, will be very important in mitigating the impacts of the Cheviot Coal Project. The Cardinal Divide Natural Area appears to be capable of providing a significant refugia for numerous plant, bird, small mammal, and ungulate species which will be disturbed by mining activities. These attributes will be further enhanced if the interdiction against vehicular access into the Cardinal Divide Natural Area is enforced. Furthermore, the Panel believes that the Cardinal Divide, with some relatively minor additions to its boundaries, could also act as a very effective travel corridor for a number of valued wildlife species, particularly carnivores. This could have significant regional benefits since, as noted in Section 4.3 of this report, the Panel is concerned that CRC's Carnivore Compensation Program may not ultimately be adequate to mitigate regional impacts to carnivore populations. Should this prove to be the case, the Panel would require CRC to be able to suggest feasible alternative approaches. The Panel notes that, should the province decide to include section 30 and the south half of section 27-45-23 W5M into the Natural Area as requested by the Alpine Club Coalition, this would have no negative effect on CRC specifically or on mineral extraction generally.

Third, with regard to the relationship between upper Prospect Creek and the Cardinal Divide

Natural Area, the Panel notes that the mining of pits PC7 and PC8, as applied for, will cause the mine to encroach more closely (i.e. within 300 m) to the Cardinal Divide Natural Area than at any other point. As noted earlier, the Panel, should it decide to approve the Cheviot Coal Project, will require that a 1000 m buffer generally be retained between the Cardinal Divide Natural Area and mine developments. Therefore, at a minimum, revisions to CRC's mine plans for this area will be required.

As noted earlier in this report, the Panel does not, subject to some minor conditions, anticipate that the Cheviot Coal Project will have a significant adverse environmental effect on the Cadomin Caves Candidate Natural Areas, but has suggested monitoring of possible impacts from the camp, if located near the access point to the Caves, and of blasting may need to be carried out.

6.3 Jasper National Park

6.3.1 Views of the Applicant

Existing Conditions

Jasper National Park contains 10 878 km^2 of mountains, valleys, lakes, and Rocky Mountain wilderness. A portion of the eastern boundary of the Park, the Miette Range, serves as the western boundary of the Cheviot study area. At its closest point the boundary of the Park is approximately 2.8 km west of the proposed Cheviot mine permit area and is separated from the Cheviot Coal Project by Prospect Mountain and the Cardinal Divide Natural Area.

Land and resource use activities on lands adjacent to the Park include coal mining, quarrying, big game hunting and outfitting, trapping, ecotourism, commercial and recreational equestrian trail rides, off–highway vehicle use, camping, hiking, fishing, and nature appreciation. Access routes into Jasper National Park from lands within the study area examined by CRC included:

- an equestrian, hiking, and motorized recreation access trail from Highway 40 up Drinnan Creek to Mystery Lake, and non–motorized access beyond Mystery Lake to Miette Hot Springs;
- a hiking/equestrian/mountain biking trail from the Whitehorse Creek Recreation Area up Whitehorse Creek through Fiddle Pass (Whitehorse Pass) to Miette Hot Springs;
- a hiking and equestrian trail, starting below the Cardinal Divide and proceeding up the Cardinal River and into the Park via Cardinal Pass (Rocky Pass); and
- equestrian trails from Cardinal River starting near Grave Flats and Muskiki Lake up Ruby Creek, Flapjack Creek, and Thistle Creek to their headwaters and into the Park at Southesk Meadows.

Expected Effects

CRC stated that it recognized that there were public concerns raised over the proximity of the proposed Cheviot Coal Project to Jasper National Park. CRC noted that in fact the closest point between the permit boundary and Jasper National Park is 2.8 km and that the distance between the Park and the nearest disturbance area is even greater. Further, there exists a number of prominent terrain features, including mountains and high elevation ridges, between the Park and the proposed mine permit area. CRC also noted that, due to the orientation of the proposed mine, only the western–most end of the proposed project is proximate to the Park, with mining scheduled to occur in that area during 2007 to 2013.

CRC stated that its experience with the Luscar mine revealed that the mine had had little if no effect on the integrity of Jasper National Park. CRC noted the observation at the hearing by Parks Canada officials that there had been no documented problems caused by the existing Luscar mine over the past 27 years.

CRC recognized that, although public access will continue to be open during the transportation corridor construction phase, there may be some temporary reduction in the number of visitors to the Park from the back country trails. After this phase, the proponent submitted that there may actually be an increase in back country visitors due to the improved road conditions between Cadomin and Mountain Park. CRC committed to maintaining communication with Jasper National Park staff to ensure that mine development and operations do not unduly affect access to the Park from back country trails.

Based on the information it had gathered, including previous experience with the Luscar mine and the commitment to ongoing communication, CRC did not believe that there would be any significant impacts on Jasper National Park.

6.3.2 Views of the Interveners

Parks Canada noted that their legislated mandate is to protect the integrity of all national parks. Further, their guiding principles and operating policies provide direction for Parks Canada to become involved in projects which have the potential to negatively impact the ecological integrity of any national park.

As Jasper National Park is contiguous with the proposed project area, Parks Canada was concerned with potential impacts on the Park, which is identified as a world heritage site, from the Cheviot Coal Project. Parks Canada indicated that their primary concern with the proposed Cheviot mine project lies in the fact that any deterioration in the regional ecosystem has the potential to impact Parks Canada's ability to meet its mandate for ecological integrity within the Park. They noted that the ecological integrity of Jasper National Park is dependent on favourable ecosystem conditions in the region; therefore, sustainability and viability must be established as measurable goals within the region and the cumulative impacts of all human activities must be evaluated against these goals.

Parks Canada stated that, in its view, the applicant had insufficiently addressed the issues of

cumulative effects. Parks Canada stated that a regional management authority should be established to oversee the development and implementation of strategies to meet the landscape level of goals for the regional ecosystem. Parks Canada stated that this authority should be established by the regulatory agencies of AEP and Parks Canada and should include major disposition holders in the region.

Parks Canada stated that it recognized that no one player could successfully implement regional initiatives and indicated that they would be committed to actively participating in such initiatives. Parks Canada indicated that it is committed to working with others towards a sustainable future and a sustainable landscape and noted that agreement on landscape level goals was, in their opinion, a critical first step. Given this, Parks Canada strongly urged the Panel to establish measurable goals that will form the basis for cooperative actions on the ground. Parks Canada stated that by implementing actions which move towards the realization of ecosystem goals, its concerns would be minimized (see Section 4.3).

The AWA Coalition supported Parks Canada's mandate of "preserving Jasper National Park as a world heritage site dedicated to the preservation of the Park and leaving it unimpaired for the enjoyment of future generations". They noted that one of its members, the Jasper Environmental Association, due to its limited numbers and resources had, as its main focus up until now, almost entirely things that are happening inside the Park. However, because development in the greater ecoregion around the Park could potentially have devastating effects on the Park itself, they had made the decision to become involved in the hearing process.

The AWA Coalition submitted that Jasper National Park is not an island; rather, it is part of a larger ecosystem. Therefore, based on the policy of the National Parks Act whereby protection of the ecological integrity takes precedence over any other use and the evidence presented at the hearing stating that the region's ecological integrity would be compromised, the AWA Coalition felt that the proposed mine should not be approved.

6.3.3 Views of the Panel

In assessing the potential impacts of the Cheviot Coal Project on Jasper National Park, the Panel believes it is necessary to be cognizant of both the general east–west orientation of the project and the regional topography. These are highly relevant since, while the western extent of the mine disturbance will be within 3 km of the Park boundary, the vast amount of the areas with high activity (e.g. the coal processing plant) will be several kilometres further away. Furthermore, the presence of significant topographical features between the mine and the Park will further serve to create a barrier between the two land uses. The Panel believes that, overall, CRC's commitments regarding access to the Park, plus its other programs (e.g. the Carnivore Compensation Program), are adequate to mitigate any short–term negative impacts and ensure that longer–term environmental effects are addressed. The Panel does not believe that the Cheviot Coal Project, either on its own or cumulatively, compromises the ecological integrity of Jasper National Park.

With regard to Parks Canada's suggestion that a regional management authority be created, while such a concept may have merit, any such decision would clearly need to be made by both the

appropriate provincial and federal authorities when and how they saw fit, undoubtedly following considerably more discussion than occurred at the hearing.

6.4 Recreational Users

6.4.1 Views of the Applicant

Existing Conditions

CRC stated that it recognized that the Cheviot Coal Project lies within an area of great natural beauty which is attractive to a large number of recreational users. Popular summer activities include camping, hiking, off–highway vehicle use, horseback riding, caving, fishing, mountain biking, and sightseeing. Other seasonal uses include hunting, snowmobiling, and cross country skiing.

A study conducted by CRC revealed that, within an area bounded by Highway 40 and the Grave Flats Road, an estimated 13 000 user days are spent annually by recreation seekers. A total of 2 600 user days per year were spent just within the proposed mine permit area. A majority of the users (61 per cent) were from Edmonton and area, while local use (Edson, Hinton, and Robb) made up 15 per cent. Some 80 per cent of the visitors had visited the area more than once.

Expected Effects

CRC acknowledged that recreation sites within the local area corridor will undoubtedly be affected, and noted that the development plans for the proposed project would be guided by the resource management objectives and policy guidelines laid out for recreational use of public land in the Coal Branch Sub–Regional Integrated Resource Plan.

CRC stated that public access to trails within the proposed mine development area would be affected, particularly off–highway vehicle access in the Mountain Park area. Elimination of the existing vehicle staging facility at the Mountain Park Recreation Area would also eventually occur. However, since road conditions along the Grave Flats Road would be greatly improved and public road access would be maintained through the mine permit area to the Cardinal River and Grave Flats area, potential increases in the recreational use in these areas was possible.

CRC stated that opportunities for off-highway vehicle recreational use would likely be reduced if the Cheviot Coal Project is approved. During the 1995 summer period, a survey by CRC indicated that there is a wide range of other locations across the province that off–highway vehicle users could access. CRC believed that it is likely that the off–highway vehicle users would perceive other areas as more desirable once construction and mining began in the Mountain Park area.

CRC stated that there should not be any effect on current commercial recreational outfitters based out of the Whitehorse Creek area for the life of the proposed Cheviot mine, and only minimal effects on general outdoor recreation in this area were predicted. Any effects would include the elimination of random camping and access areas currently used along the local area corridor.

CRC noted that traditional access to Jasper National Park through Fiddle, Rocky, and Cardinal passes would be maintained. CRC committed to maintaining recreational access, or providing alternative routes, where feasible.

CRC stated that, in accordance with the Integrated Resource Plan, they would focus on recreational uses in their reclamation plans for the disturbed areas along the McLeod River corridor in the vicinity of the abandoned Mountain Park townsite. The applicant stated that they would also conduct an annual review of its development plans and their implications for access. With input from stakeholders and government land managers, CRC committed to replacing recreational facilities equivalent to those which currently exist. In particular, CRC noted that, with regard to the Mountain Park recreation/off–highway vehicle staging area, it would be necessary to determine the feasibility of replacing the site with equivalent facilities at a nearby location, what optional site locations are available, and what criteria should be used for selecting a preferred location. CRC anticipated that these decisions would be addressed with multi–stakeholder input which could include, but not be limited to, public land managers, off–highway vehicle users, the Cardinal Divide Natural Area stewards, Alexis First Nation, the company, and any others who have a direct interest.

With respect to scenic values, mining activity will be visible from several locations within the local area corridor, including the Mountain Park cemetery and parts of the Cardinal River Divide Natural Area. CRC indicated that visual impacts on recreationalists travelling within the proposed mine development area could be minimized through the design and alignment of roadways and power lines to minimize intrusion on the landscape. Where mine development is obvious from the road, interpretive opportunities at these locations would be considered.

CRC noted that recreation sites within the transportation and utilities corridor, including Whitehorse Creek and Cadomin Caves, will experience short–term effects during construction of Grave Flats Road, but should not be affected during the life of the mine. Jasper National Park was not expected to be significantly affected by the proposed mine development or operation.

Cumulative Effects

In addressing potential cumulative effects on recreation, CRC stated that there are several other activities such as changes in land jurisdiction, future public policy, and program changes that may have implications to recreational use in the local area. CRC noted, for example, that the Treaty Land Entitlement provided to the Alexis First Nation had resulted in the closure of the Cardinal River Recreation Area in 1995. Furthermore, CRC observed that all Alberta public land management for recreation is currently undergoing significant changes. In the future, all public recreational sites will be considered on an individual basis for privatization, reduced service, or closure and these initiatives may affect the current recreational use and distribution of recreational activities in the region.

CRC noted that timber harvesting in the region may also affect recreational opportunities. Forest harvest plans are currently under preparation by Weldwood of Canada Limited (Hinton Division). The company plans to begin harvesting operations north and east of Cadomin in 1996/97 and continue to harvest within the region over the next 20 years. As part of the

company's commitment to the Foothills Model Forest, Weldwood had conducted a detailed assessment of recreational use throughout the region, including the local area which will be influenced by the proposed Cheviot Coal Project.

Monitoring and Follow Up

CRC committed to working with public land managers to monitor the effects of mine development on recreation throughout construction and operation. Outside the mine development area, CRC noted that the Coal Branch Access Management Plan would provide direction to access planning and mitigation. CRC stated it would also work with public land managers to develop a communications plan aimed at area recreation users, encouraging use of Whitehorse Creek, Watson Creek, and other alternative recreation sites within the region.

6.4.2 Views of the Interveners

The Alberta Fish and Game Association stated that it was disappointed and concerned with the lack of recognition given by CRC to hunting as a valued recreational activity. They noted that throughout the application there was little mention of the impact of the loss of hunting opportunities or how the impacts would be mitigated or compensated for.

The Alberta Fish and Game Association believed that CRC's application was ambiguous with respect to timing and availability of access to wildlife resources in the area of the mine. The Alberta Fish and Game Association believed that it would be important to find a balance between restricting the public and allowing controlled access so that a build up of non–streetwise wildlife may be prevented. To accomplish this, the Alberta Fish and Game Association believed that existing access management policies should remain in place as long as possible, until mining would prevent safe access. Further, they requested that CRC open reclaimed land to public access as soon as possible.

AEP suggested that, although there would be a large number of campers displaced, there were other campgrounds in the vicinity which should be able to accommodate these people. They also commented that it could not, at this point, be positive as to where the campers would ultimately choose to relocate, and therefore there was potential of increased pressure at some individual sites. AEP noted at the hearing, in response to questions, that the necessary steps to create FLUZs in the region had been carried out, short of requesting an Order–in–Council from the Alberta Government. AEP also advised the Panel that, since most of the area was already open to off–highway vehicle use, AEP had not, as yet, considered creating an area dedicated to off–highway vehicles, such as the McLean Creek area in Kananaskis Country.

The Alpine Club Coalition and the AWA Coalition stated that they were concerned that the off–highway vehicle displacement from the proposed mine disturbance area would result in intensive activities in the Cardinal Divide Natural Area and other environmentally sensitive areas. The Alpine Club Coalition submitted that they were particularly concerned about access management plans, specifically as they relate to off–highway vehicle activities. The Alpine Club Coalition noted current off–highway vehicle impacts and felt that inappropriate re–introduction or relocation of off–highway vehicles from CRC's mine permit area to other locations could

jeopardize CRC's wildlife mitigation and reclamation plans. It was suggested by the Alpine Club Coalition that an effective access management plan, based on ecological rather than historical criteria and reinforced by a FLUZ, should be established.

The Town of Hinton noted that outdoor recreational opportunities are clearly a valued part of life for town residents. They submitted that indicators such as high utilization of nearby areas by local residents, high ownership rates of recreational vehicles, and license purchases for hunting and fishing are reflective of this value. The Town of Hinton felt confident that CRC would continue to demonstrate the same high level of corporate environmental stewardship at the proposed Cheviot mine as it had at the Luscar mine.

CEPA noted that the residents of Cadomin make significant use of the surrounding environment. Therefore, they noted that they were concerned about how access to various areas would be impacted should the mine proceed. CEPA submitted that access to areas should not be restricted by CRC until absolutely necessary, and that access be returned at the first available opportunity. It was CEPA's request that the Panel, in its decision, make recommendations to the appropriate authorities responsible for addressing these concerns.

CEPA, in its submission, noted that CRC had as yet returned very little of its reclaimed surface lands at the Luscar mine back to the public, apparently due to CRC's concerns with potential damage to young trees and non–regulated hunting impacts to wildlife. Since recreational use of lands in the area had increased dramatically, CEPA stated it wished to see this avoided at the Cheviot Coal Project. CEPA believed that first, surface rights, through Mineral Surface Leases (MSLs), should only be provided by AEP to CRC on an as needed basis, therefore allowing ongoing public access. Second, they suggested that CRC's MSLs should stipulate that public access to lands not being used for mining be permitted wherever safe to do so. Once lands were returned to the province no access restrictions should be imposed or, if necessary, graduated access could be permitted. Finally, CEPA indicated that it strongly supported voluntary access control since legislated control, through FLUZs, was, in its view, insufficiently flexible and/or too difficult to amend at a later date.

The AWA Coalition submitted that a number of policies, including the Coal Branch Integrated Resource Plan, emphasized the importance of maintaining the visual quality of scenic areas. It was felt by the AWA Coalition that CRC had failed to assess the impact of the project on the aesthetic qualities of the region. They indicated that the mine would directly or indirectly impair many of the features which gave the area a high scenic quality rating.

Trout Unlimited stated that they were appreciative of the communication that CRC had provided to them; however, Trout Unlimited submitted that CRC's application, as proposed, would surely result in deleterious impacts to fish habitat and therefore recreational opportunities. Trout Unlimited felt that implementation of the mitigative measures proposed in its intervention would lessen the impacts of the mine on streams and ultimately reduce impacts on recreational fishing.

6.4.3 Views of the Panel

The Mountain Park area currently provides a diverse number of recreational opportunities to a wide range of groups. The Panel is prepared to accept CRC's commitments to work closely with both recreational users and provincial land managers in order to mitigate to the extent possible the direct impacts of the Cheviot Coal Project on recreation. The Panel is also prepared to accept CRC's commitment to minimize to the degree practical the curtailment of public access for recreation on its leased lands.

However, the Panel believes that it is very likely that much, if not all, of the Cheviot mine site will be unavailable for recreational purposes for much of the life of the mine, and in fact some period following that. The Panel notes that much of the public access to the area currently occurs from the Grave Flats Road at or near to the former townsite of Mountain Park. However, this will also be the area of greatest mining activity and so public access through here, if any can be provided at all, will almost undoubtedly be very limited. Other alternative access points could be developed, but doing so would appear to be inconsistent with protecting other area resources (e.g. wildlife, the Cardinal Divide Natural Area). Therefore, the Panel expects, at least in the near term, that there will be little opportunity to avoid direct impacts on the current recreational uses of the area, particularly for hunting, fishing, off–highway vehicle use, and random camping.

The Panel does accept that, in a regional and provincial context, other areas of equal quality are likely available for recreational purposes and that, to some unknown degree, can likely absorb the demands displaced by the Cheviot Coal Project. The Panel does not expect, however, that these demands will be evenly distributed, but rather that a disproportionate number of recreational users will likely wish to transfer their present recreational activities to areas in the immediate vicinity of the Cheviot Coal Project. This issue may actually be further exacerbated by the increased level of all season access which would be provided by the proposed upgrades to the Grave Flats Road. As a result, the Panel believes that the cumulative effects of the Cheviot Coal Project on current recreational use will also be significant.

The Panel notes that at least some regional recreational activities already potentially conflict with other area land users. For example, allowing indiscriminate use of off–highway vehicles on the sensitive alpine terrain of the Cardinal Divide Natural Area, or open access hunting in areas currently serving as refugia for ungulates on the Luscar mine site, would appear to be inconsistent with each other. The Panel agrees with the Alpine Club Coalition that it would be unacceptable if significant disturbance of the Cardinal Divide Natural Area was to occur due to improperly managed human activity resulting from the approval of the Cheviot Coal Project. Similarly, the Panel agrees with the Alberta Fish and Game Association that hunting in the area of the Cheviot mine will need to be carefully managed, and in fact believes that the protection and re–establishment of wildlife in the region may need to be placed ahead of the maintenance of hunting opportunities.

The Panel notes that the Integrated Resource Plan, both explicitly and implicity, recognizes that not all areas can support all land uses at all times. In the case of the Cheviot region, the Panel believes that the area can support a significant mining industry proximate to two significant ecological resources, the Cardinal Divide Natural Area and Jasper National Park. Furthermore,

the Panel believes that these two disparate land uses can be accomplished while also still protecting area watersheds and water quality, fish and wildlife populations, and forestry resources.

The Panel is not convinced, however, that all of the above can be accomplished while also maintaining all current recreational activities within proximity to both the mine and the protected areas. For area land managers to attempt to do so, the Panel believes, could, at a minimum, put at risk the two areas being protected for their ecological values. In particular, the Panel is very concerned that off–highway vehicle use currently being carried out within the mine permit area will relocate to the Cardinal Divide, upper Prospect Creek, and the upper Cardinal watershed. Should this occur, then the Panel believes that the value of these area's ecological resources, and therefore their value in mitigating the cumulative effects of the Cheviot Coal Project, will be significantly reduced. Should that occur, then the Panel believes that the public acceptability of the Cheviot Coal Project would also be at risk.

The Panel does believe that, if acceptable alternative recreational opportunities can be established at some distance from the Cheviot Coal Project, this would likely reduce the risk of unacceptable conflicts significantly. One possible alternative that area land managers may wish to consider is the creation of a new off–highway vehicle recreational area akin to the McLean Creek region of Kananaskis Country. The Panel understands that McLean Creek has been successful in reducing similar conflicts in southern Alberta. The level of development in the Coal Branch region, particularly given the likelihood of further commercial and recreational pressures, may now make development of such an area in central Alberta timely.

The Panel notes CEPA's wish that both the government and CRC be required, through the MSL process, to grant ongoing public access to lands either not being actively mined (assuming public safety can be protected) or recently reclaimed (provided reclamation efforts are not compromised). Further, CEPA has argued that voluntary access management be continued. The Panel does not believe that either of these requests is likely to be practical. In particular, it would seem inevitable to the Panel that stronger, not weaker, regulatory control of access will be required by land managers if they are to carry out their obligations of meeting a range of conflicting public needs. However, the Panel also notes that ultimately these decisions clearly lie within the regulatory responsibility of AEP and not the Panel.

6.5 Commercial Users

6.5.1 Views of the Applicant

CRC stated that it had evaluated the potential impacts of the Cheviot Coal Project, should it be approved, on other commercial users.

Coal

CRC noted that throughout the region there are a number of developed and undeveloped metallurgical and thermal coal leases. Only one of these leases would be directly affected by the proposed Cheviot Mine Project. The lease in question is the small (101 ha) privately held Crown

lease, located just inside the west boundary of the project area. Development of these coal reserves is subject to further exploration work by CRC but, if these reserves did prove to be economically mineable, they could be incorporated into the Cheviot mine plan. Should this happen, it would generate a significant positive economic impact for the Crown lease holder. CRC advised the Panel that it had initiated discussions with the lease holders, and that they were in support of its application. However, CRC stated that on its own the Crown lease contains insufficient reserves to make coal mining economically viable, given the capital costs necessary for infrastructure and equipment needed to mine and transport the coal to market.

Timber

CRC stated that development and operation of the proposed Cheviot mine could have a negative effect on a small portion (1070 ha) of Weldwood of Canada's Forest Management Area (FMA) which overlaps the east end of the Cheviot Coal Project area. According to Weldwood's long–term plans, this area is not currently scheduled for first pass harvesting until 2020, which would be after the area had been disturbed by mining. If Weldwood's harvesting schedule cannot be moved forward, CRC stated that it would make arrangements to harvest and salvage the merchantable timber for Weldwood. Mining activity would then delay reforestation of the disturbed area of the FMA for up to five years, and this in turn would similarly delay the next harvesting cycle in this portion of the FMA. However, given the size of the area in question relative to the total Weldwood FMA, the overall effect of the Cheviot mine operations on this portion of Weldwood's FMA was expected to be insignificant in duration.

Oil and Gas

CRC noted that there are no oil or gas leases, fields, operating facilities, or exploration activities in the Cheviot mine project area. There is one abandoned natural gas well located next to the Cardinal River that has been turned over to the Crown. With the exception of this abandoned well, the closest gas well is located 8 km east of the Cheviot Coal Project area. One energy company had previously expressed some interest in exploring for natural gas within the project area but has not reconfirmed its interest in recent years. As a result, it appeared to CRC that it was unlikely that the proposed mine development would affect oil and natural gas activities in the foreseeable future.

Limestone and Other Minerals

CRC acknowledged that there are eight limestone leases in the local area. Only one lease, at Cadomin Mountain, which is owned by Inland Cement, has been developed. None of the limestone leases are located within the proposed Cheviot Coal Project area and CRC stated that these leases would not be affected by any aspect of the mining activities. In addition, CRC noted that there are a number of metallic and industrial mineral exploration permits that overlap a portion of the Cheviot Coal Project area. However, CRC believed that exploration and test results to date have not been promising, and noted that the permits were scheduled to expire. As a result, CRC believed that the proposed Cheviot Coal Project would have no effect on the metallic and industrial mineral exploration permit holder.

CRC noted that Inland Cement owns a small group of residences at the south end of the Hamlet of Cadomin. These residences include several homes which the company rents to employees and a guest house. CRC stated that the proposed Cadomin bypass route would merge with the existing road and power line routes in the vicinity of these homes. Further south, a side entrance off of the upgraded Grave Flats Road would be provided to access Inland Cement's quarrying operations.

The upgraded rail line to the proposed mine would follow the present alignment and bypass the existing rail loading area at Inland Cement. Separate main line trackage is proposed to be provided through this area in order to eliminate conflict with the ongoing loading of rail cars by Inland Cement. Details of the trackage layout in this area are part of ongoing negotiations between CNR and Inland Cement. It was expected by CRC that any changes to trackage would be accommodated within the rail yard area already in place in this area.

Trapping, Hunting, Outfitters, and Ecotours

The proposed Cheviot Coal Project overlaps a portion of three Registered Fur Management Areas (RFMAs). Two, RFMAs 2262 and 1872, would not be directly affected by construction of the transportation and utilities corridor, the preparation plant, or initial mining activities, while the effect on one (RFMA 1728) would be minimal. During mine operations, fur–bearer habitat in all three RFMAs will be lost due to land disturbance. Furthermore, RFMA 1872 would be affected by Weldwood timber harvesting, while RFMA 2262 would be affected by the Alexis First Nation land acquisition. CRC stated that it had provided the three RFMA holders with advance notice of the proposed mine plan and that compensation would be provided if traplines have to be relocated within the RFMAs. In addition, fur–bearer harvests in the RFMAs would be monitored during mine operations, and fair and equitable compensation would be paid to the RFMA holders for long–term loss of fur–bearer habitat and project related decline in fur revenues. After compensation, the residual impact on trapping was expected by CRC to be insignificant.

CRC stated that the proposed Cheviot Coal Project lies within the boundaries of Wildlife Management Units 437 and 438, where two hunting outfitters operate. CRC noted that the proposed Cheviot Coal Project plan would disturb a substantial amount of wildlife habitat and some access trails through the area, which could adversely affect the two outfitters. In addition, there will also be a cumulative loss of wildlife habitat in the two Wildlife Management Units as a result of Weldwood's timber harvesting activities.

For its part, CRC noted it would mitigate the adverse effects on wildlife habitat through sequential pit and dump development; prompt reclamation designed to enhance elk, moose, and deer habitat; protecting wildlife from hunters within the mineral surface lease; and providing hunter access trails through the mine permit boundary to adjacent wildlife habitat. As noted previously, the access trails would be developed in consultation with public land managers responsible for implementing the Coal Branch Access Management Plan.

CRC stated that all of the outfitters who hold wildlife allocations in Wildlife Management Units 437 and 438 have been notified as to the proposed Cheviot plans for development. The only

serious concerns expressed were related to access routes through the permit site to the hunting areas. CRC has committed to maintaining ongoing dialogue with these individuals to ensure that their needs are addressed. Given the location of proposed construction activities, the affects on big game hunting and outfitting were predicted by CRC to be insignificant.

CRC noted that there are two equestrian trail riding operators, two Cadomin Caves guided tour operators, and at least two environmental education/ecotourism tour operators working in the region. None, however, operate within the proposed Cheviot Coal Project boundaries. The Grave Flats Road, which provides access to staging areas such as the Cadomin Caves parking lot, Whitehorse Creek Recreation Area, and Cardinal Divide used by these commercial operators would be kept open to the public in the construction period and subsequently upgraded. As a result, CRC stated that the effect of mine related construction and operation on these commercial operators and their tourist clientele is expected to be insignificant.

6.5.2 Views of the Interveners

Mr. Gadd, who intervened as part of the AWA Coalition, indicated that his main interests in the area of Mountain Park and the Cardinal Divide was as an interpretive guide and as a geologist who had a technical interest in the Canadian Rockies generally, and more specifically with an interest in the Cardinal Divide area. Mr. Gadd noted that his commercial tours, which approach the Cardinal Divide from the north, pass the Luscar and Gregg River mines and the Inland Cement quarry. He submitted that, for a client who came to view natural landscapes, this level of development is unattractive and often caused his clients to comment negatively.

Mr. Gadd stated that, in his view, if mining were to proceed his clients' eco-experience would be lost and that they would probably not want to come back. Mr. Gadd acknowledged that, while it was difficult to put the loss of ecovalues into economic terms, he believed that an economic assessment should have been done by CRC, and that this was a deficiency in the proponent's application. Mr. Gadd was confident that if a comprehensive environmental accounting were done for the area, it would reveal that the long–term economic and social benefits to west–central Alberta of protecting the Cardinal Divide region would far outweigh the short–term infusion of money from mining.

Weldwood noted that the proposed Cheviot mine would abut the Weldwood industrial forest and that there would be issues of common concern such as water yield and quality, management of large mammals, and issues around displaced off–highway vehicle users. Weldwood recognized that these issues would need to be worked on cooperatively and, based on historical working relationships, was confident that its productive relationship with CRC would continue. Weldwood also noted that a multi–stakeholder approach would be necessary for certain issues and stated that it would be willing to participate. Given this, Weldwood submitted that they supported CRC's Cheviot mine application.

6.5.3 Views of the Panel

The Panel notes that the region surrounding the Cheviot Coal Project contains a number of industries. Most, however, appear to be compatible with the Cheviot Coal Project as envisioned.

The Panel does expect that development of the Cheviot Coal Project will have a negative effect on trapping in the area, but whether this impact will be significant cannot be predicted at this time. However, the Panel will expect CRC to honour its commitments to develop a fair and equitable compensation agreement with affected trappers. The Panel does not anticipate that significant negative impacts to commercial hunting operations would occur as a result of the Cheviot Coal Project.

The Panel does believe that development of the Cheviot Coal Project will have a significant impact on the value of the Cardinal Divide Natural Area as a destination for those tourists seeking a wildlands experience due to aesthetic impacts, but does not expect areas further south or north of the proposed mine will be significantly affected. The Panel does not believe that the Cheviot Coal Project will significantly reduce the other ecological (and therefore ecotourism) values of the Cardinal Divide.

7 COMMUNITY EFFECTS

7.1 Mountain Park Townsite

7.1.1 Views of the Applicant

The former Town of Mountain Park (Figure 7) is located just upstream of the confluence of Thornton Creek and the McLeod River and situated along the Grave Flats Road and so is roughly centred within the Cheviot Coal Project. Mountain Park was developed in the early part of the century to serve area coal miners and their families, and was abandoned in the early 1950s when local coal mining ceased. CRC noted that, although the Mountain Park cemetery is intact, no above ground structures exist in the former townsite. However, a number of subsurface structures, including the positively identified Chinese Cafe and the two main town dumps are all well preserved.

At the hearing, CRC advised that from the outset of the Cheviot Coal Project, the company had committed to avoid disturbing the Mountain Park cemetery. In order to do so, the company indicated it planned a minimum 60 m buffer between the cemetery boundary and any mine disturbance. CRC also advised that it had been working diligently to preserve/record the heritage elements of the former townsite, including carrying out an Historical Resources Impact Assessment (HRIA). CRC noted that it had undertaken a number of modifications to its mine planning and site selection process in order to avoid disturbing as much of the former townsite as possible, while still recovering the important coal reserves beneath the former townsite.

CRC stated that it was prepared to minimize external waste dumping within the area of the old townsite, at significant additional cost, and that protecting the heritage values of the townsite and cemetery were also important factors in its selection of the site for the coal preparation plant and offices. CRC stated that it was also prepared to ensure that access to the cemetery was provided, to contribute to the maintenance of the cemetery, and, if deemed appropriate, provide for public interpretation. As a result of these mitigation programs, CRC stated that it believed that the impacts on the former townsite and the cemetery were insignificant.

7.1.2 Views of the Interveners

The Mountain Park Association noted that its membership is made up largely of individuals who had strong family ties to the former town. They advised the Panel that reunions of the various families who once lived in the area still take place every five years on the former townsite. Many of their association also have family members interred in the Mountain Park cemetery. As a result, both the townsite and the cemetery had special historical, cultural, and aesthetic values for them, as well as, they believed, broader public values. While the Mountain Park Association stated that they were not opposed to coal development per se, they did believe that the Cheviot Coal Project, as designed, would result in unacceptable impacts to the values of the former Mountain Park townsite specifically, and the surrounding area generally.

At the hearing, the Mountain Park Association recounted some of the history of coal mining in the region. They noted the low wages and the struggles between the workers and the companies

to achieve better salaries and working conditions. They also described the risks associated with early underground coal mining. They told the Panel that it was, to a large degree, due to the efforts of these pioneers that mining could be carried out as safely and economically as it is. As a result, they felt it was very important that an appropriate memorial, through the preservation of the area's history, be left for those people.

With regard to the cemetery, the Mountain Park Association stated that they were not convinced that CRC's plans to protect the Mountain Park cemetery from disturbance were adequate, and proposed that the buffer between the cemetery and mine disturbance be increased. Furthermore, they believed that this buffer should be legislatively protected through the application by the Government of Alberta of a Protective Notation (PNT) to the site. The Mountain Park Association also indicated that they would support the installation by CRC of interpretive signage to inform visitors regarding the history of the cemetery.

With regard to the former townsite, the Mountain Park Association stated that CRC should, at an absolute minimum, be required to leave the entire townsite undisturbed, rather than just a portion. Ideally, the Mountain Park Association stated that it believed that a much greater reduction of surface disturbance in the area around the former townsite was also appropriate. They noted that much of the historical and sentimental value of the site was tied to the surrounding vista and natural beauty of the area. In their view, CRC's plans to create extensive rock drains and external waste rock dumps would destroy these values, as well as destroying irreplaceable habitat for fish and wildlife.

At the hearing, AEP advised the Panel that it was their understanding that a PNT for the cemetery had been established and that it had recently been expanded from an area set at the cemetery fence line to an area approximately 60 m on all sides beyond the cemetery fence. In response to questions from the Panel, AEP advised that if further protection of these resources was warranted, it saw no obvious problem with either increasing the PNT for the cemetery or applying a PNT to the former Mountain Park townsite. Alberta Culture did advise the Panel that, in its view, the area of Mountain Park proposed to be preserved by CRC was adequate from an historical and cultural perspective.

7.1.3 Views of the Panel

The Panel believes it can understand the concerns raised by the Mountain Park Association, and can sympathize with their feeling of loss. However, the Panel also understands CRC's position that very significant coal resources are buried below the former Mountain Park townsite.

In this case, the Panel does not believe that the public interest would be best served by leaving those coal reserves in place in order to preserve the entire former townsite. The Panel notes that from the perspective of Alberta Culture, the area currently proposed to be preserved is adequate. Given that there are no surface structures remaining, the Panel accepts that CRC's proposal will preserve a sufficient portion of the former townsite that its historical value to the general public will still be preserved, even though its sentimental value to former residents will very likely be compromised. The Panel would urge that the Alberta government place a PNT around the area of the former townsite to be preserved in order to provide some additional assurance to the

members of the Mountain Park Association that the former townsite has legislated protection. The Panel expects CRC to keep its commitment to work with both Alberta Culture and the Mountain Park Association in the design and maintenance of appropriate signage, access, and public parking.

With regard to the Mountain Park cemetery, the Panel notes that AEP appears to have already used a PNT to create a legislated protected zone around the cemetery. The Panel is not convinced, however, that a 60 m buffer between the cemetery and mine disturbance is adequate. Therefore, the Panel will require CRC to work with staff from the EUB, AEP, and members of the Mountain Park Association to re–examine the mine plan and establish whether a more substantive buffer can be established. If a larger buffer is feasible, the Panel would urge the Alberta government to expand the PNT appropriately.

7.2 Cheviot Coal Project Workers

7.2.1 Views of the Applicant

CRC stated at the hearing that it concurred with the position of Local 1656 of the United Mine Workers of America (UMWA) that its employees constituted a community of workers. CRC stated that, based on its experience at the Luscar mine site, it had no reason to doubt that the Cheviot Coal Project would provide a safe and secure workplace, characterized by cooperative labour management relationships, progressive work practices, and significant job security. The net result of approval of the Cheviot Coal Project, CRC felt, would be a significant positive impact on the existing Luscar mine workforce as the approval would allow a planned and orderly transition from one facility to the other. Other public benefits such as the minimal wastage of coal resources, a stronger worker commitment to environmental protection, and greater involvement in community activities would also be achieved if the current levels of high worker job satisfaction and feelings of commitment to the region could be maintained in the Cheviot Coal Project workers.

7.2.2 Views of the Interveners

At the hearing, the workers at the existing Luscar mine, through their union, expressed unequivocal support for the Cheviot Coal Project, as well as pride in the current company operations at the Luscar mine, including its environmental practices. In their evidence, they also highlighted the significant negative effects which would occur should the mine not be approved. The UMWA noted that more than 500 jobs would be lost, affecting a population of 1500 people. Most, they believed, would need to relocate from the area with their families, and would also experience a reduction in income and their standard of living. Such losses, they believed, would also weaken the social fabric of the other area communities.

The UMWA also noted that the jobs that would be provided at the Cheviot Coal Project were skilled, high paying, and non–cyclical. Job stability was very high, they stated, with the average length of employment greater than 12 years. Jobs associated with industries such as tourism, on the other hand, tended, in their view, to be lower paying, seasonal, and providing fewer economic spinoffs to the community.

The AWA Coalition, in its intervention, noted that approval of the CRC application would generate employment for another 20 years, but this would again end unless a new mine could again be developed, while employment from tourism and recreation, while smaller in the near term, could grow and continue indefinitely. The AWA Coalition also argued that the Cheviot Coal Project was a new project, and could not be considered, as CRC claimed, to be an extension of the existing Luscar mine in terms of workforce continuity.

7.2.3 Views of the Panel

The Panel accepts both CRC's and the workers' views that the current Luscar mine provides high quality employment. The Panel also accepts that if the Cheviot Coal Project is not approved, the economic and social impacts on those workers will be adverse and significant. In particular, the Panel notes the relative stability of the workforce at the Luscar mine as both a measure of the workers' satisfaction with their current working environment and a basis for their relative sensitivity to the impacts of a change in job security.

The Panel also believes that it is reasonable to consider the Cheviot Coal Project as an extension, when considering the community of workers, of the Luscar mine. In the Panel's view, the Cheviot Coal Project is in fact quite unique in that it is able to make use of an existing workforce already well established within an existing community infrastructure. As a result, while the Cheviot Coal Project will not create any "new" jobs, its approval would clearly help to ensure regional economic stability for at least two decades, with minimal new infrastructure costs. Furthermore, such jobs would, in a provincial context, tend to be considered skilled, stable, and relatively well paid.

7.3 Alexis First Nation and Smallboy Camp

7.3.1 Views of the Applicant

CRC stated that the Cheviot Mine Project area had been used by aboriginal peoples extending back to well before pre–contact times. In order to better understand the degree to which the area had been used by aboriginal peoples, CRC indicated that it had carried out an assessment of traditional land use in the region. As well, numerous meetings, field tours, and phone conversations had been carried out with representatives of the aboriginal communities. CRC stated that it was committed to maintaining this dialogue throughout the life of the mine. Based on the above communications, CRC advised that, in its view, three native communities, the Alexis First Nation (Stoney), the Smallboy Camp (Cree), and the non–treaty Salteau group appeared to have traditional land use interests in the area. Of these, only the Alexis First Nation and the Smallboy Camp appeared to have land use concerns proximal to or within the Cheviot Coal Project.

CRC noted that in 1993 it became aware of a land claim by the Alexis First Nation to an area south and east of the mine permit boundary (Figure 3). This Treaty Land Entitlement (TLE) also extended over approximately 45 ha of coal leases held by Luscar Ltd. CRC advised that it voluntarily relinquished its rights to those lands in order that government officials could proceed with the TLE package. In its application, CRC indicated that it was unaware of any other land claims for the area.

Alexis First Nation

CRC stated that it had identified a number of items of concern to the Alexis First Nation and had proposed a number of mitigative strategies to deal with these. CRC noted that it had concluded a memorandum of understanding with Alexis First Nation regarding employment and business opportunities.

With regard to the maintenance of water quality, CRC stated that, while it believed its project would have no significant effects on water quality within the Cardinal River drainage system, it was prepared to undertake a water quality monitoring program in conjunction with the Alexis First Nation. CRC noted that it was not prepared to avoid mining within the Red Cap/Cardinal drainage completely, since the coal reserves were critical to the success of its mine.

With regard to the magnitude of the project, CRC advised that it was prepared, in discussion with Alexis First Nation, to carry out an appropriate show of respect for the land and for the customs of the Alexis First Nation. CRC noted that while there would be a loss of traditional use areas (e.g. for hunting, gathering, burials, etc), it would review access and development plans on an ongoing basis with Alexis First Nation to maximize opportunities for their use of the land. CRC advised it would also consult with the Alexis First Nation regarding the location of possible burial sites and protocols for their relocation if any were discovered.

CRC noted that cumulative effects to Alexis First Nation lands could occur from forestry, oil and gas exploration, and regional recreation. No changes to the seasonal use of the Grave Flats Road, which would be upgraded and maintained as a four season road only to the mine site, was expected in areas proximal to the Alexis First Nation TLE. Given its proposed mitigation plans, CRC stated that it did not believe that the cumulative effects of development on the various VECs contained within the Alexis First Nation lands would be significant.

Smallboy Camp

CRC noted that the Smallboy Camp had identified the preservation of water quality, particularly in the Cardinal River drainage, as its primary concern but felt that the impacts of the Cheviot Coal Project on water quality would not be significant. CRC advised, however, that it was not prepared to avoid mining in the Red Cap drainage as suggested by the Smallboy Camp. CRC advised it was prepared to enter into a joint water monitoring program with the Smallboy Camp.

CRC noted that the Smallboy Camp also had very significant concerns with regard to the loss of traditional land uses, particularly for gathering medicinal plants and hunting opportunities. CRC committed to working with the Smallboy Camp in an attempt to identify unique plants prior to disturbance and to either allow them to be harvested or possibly even attempt to transplant them. CRC also advised it would continue to work with the Smallboy Camp regarding its wildlife programs and would ensure that its activities were carried out in a manner which respected the people and their culture.

CRC noted that while it did not believe that the Cheviot Coal Project would result in significant cumulative effects on the Smallboy Camp, it would continue to liaise with the community to ensure that its development plans were understood and that any concerns were addressed.

7.3.2 Views of the Interveners

The Alexis First Nation stated that it was their traditional use of the lands in the Mountain Park area which had led them to accepting the TLE in 1994. They also acknowledged CRC's actions in releasing its interest in a portion of the TLE.

The Alexis First Nation stated that they had selected the TLE because of its pristine beauty, clean water, fresh air, and traditional and spiritual significance, as well as because of potential future socio–economic benefits. They advised that they ultimately intended to develop an aboriginal cultural centre and ecotourism operation on the lands and so wished to preserve its environmental values as much as possible. As a result, they were concerned about the potential environmental effects of the Cheviot Coal Project.

The Alexis First Nation noted they had worked cooperatively with CRC for the past 18 months in assessing the project impacts and confirmed that they had entered into a Memorandum of Understanding with CRC regarding socio–economic benefits. They also noted that CRC had agreed to consult with them on all related future applications to the EUB and AEP, and advised the Panel they reserved their right to intervene in such applications if their rights were compromised. The Alexis First Nation also asked that the Panel ensure that future permits and licences be very specific in stipulating requirements for environmental protection, and adopt the highest standards.

As previously noted in this report, in its submission the Alexis First Nation confirmed ongoing concerns with impacts to wildlife, human health, and water quality resulting from mine development, and suggested that CRC be required to address and/or monitor these effects and report regularly to interested parties, including the Alexis First Nation. They also advised the Panel that, due to the fiduciary relationship between both the Federal and Provincial Crowns and First Nations, that if CRC's operations had an effect on their rights that the Crown was required to place their interests before those of other parties. The Alexis First Nation also wished to be assured that they would be part of all future land use and management decisions made for the region.

The Smallboy Camp advised the Panel that they had left their reserve lands at Hobbema, Alberta and travelled first to the Kootenay Plains and eventually settled in their current location approximately 15 kilometres to the east of the proposed Cheviot Coal Project in the late 1950s and early 1960s. They indicated that they had done so in order to enable the re–establishment of a traditional lifestyle based on the practice of what they termed Natural Law. The Smallboy Camp indicated that they had selected the area at least in part because of its isolation and its pristine nature.

The Smallboy Camp stated that they had over the years had other industrial development, such as oil and gas exploration, occur in proximity to their camp and had been able to reach an

accommodation with the developers. They also advised that they were not against the mines or companies per se. However, the Smallboy Camp stated that they too required certain areas of land not only for survival but also as an integral part of their identity. For the Smallboy Camp, the Cheviot area, they stated, was a key element in their attempt to relearn for themselves and to teach their children traditional native values. From that philosophical base, they hoped to be able to eventually also learn to deal more effectively with non–native culture. They stated that much of the area, and particularly Red Cap Mountain and Red Cap Creek, had important spiritual values as well as providing a major source of traditional medicines and their drinking water supply. Any acceptable development process in this region, they stated, had to give equal value to their needs and their viewpoint.

At the hearing the Smallboy Camp stated they were not trying to cause any disturbance for the people who depended on the mine to earn a living. But at the same time, they noted, they also had the right to survive, and that the land they needed was only a small fraction of what was available to the rest of society. Therefore, they were requesting that CRC not be allowed to mine within the Red Cap Creek watershed. This, they stated, represented only one–third of the total mine area, and also represented, in their mind, a reasonable compromise between conflicting needs. They also stated that they were prepared to take whatever legal steps were available to the Smallboy Camp to protect the Red Cap Creek drainage.

On her own behalf Mrs. Misitisquis Young Dave, a member of the Smallboy Camp, observed that she and her family had lived for generations in this area and that she currently derived much of her income from the medicinal plants within the Red Cap Creek drainage. This in turn helped support a number of family members. She advised the Panel that she had no idea how she would replace that income once mining started. At a minimum, she believed that some form of compensation for her economic losses would be fair.

7.3.3 Views of the Panel

With regard to the Alexis First Nation, the Panel notes that they and CRC have, after significant discussion, reached a Memorandum of Understanding regarding socio–economic issues. As a result, the Alexis First Nation advised the panel that, assuming CRC continued to meet its commitments, they were in support of the Cheviot Coal Project. From this and from their comments at the hearing, the Panel believes that, in a general sense, their concerns have been addressed by CRC.

With regard to specific concerns raised by the Alexis First Nation (e.g. wildlife, water quality, health), the Panel believes that these have been addressed in the appropriate sections of this report. The Panel therefore concludes that, provided CRC's undertakings to the Alexis First Nation are met, the environmental effects of the Cheviot Coal Project on the Alexis First Nation will not be significant.

With regard to the Smallboy Camp, the Panel is prepared to accept that, although the community itself is some distance from the mine, the lands proposed to be mined by CRC, particularly within the Red Cap Creek drainage, are part of the lands currently used by the members of the community. However, although the Smallboy Camp may ultimately be affected by the approval

of the Cheviot Coal Project, the Panel does not believe that the public interest would be served by precluding the mining of the coal reserves within the Red Cap Creek drainage.

The Panel notes that there seems to be little opportunity for compromise between the positions taken by the Smallboy Camp (i.e. that mining within the Red Cap Creek drainage should not be permitted) and CRC (i.e. that mining within the Red Cap Creek is vital to the economic viability of the project). While recognizing that the circumstances between the two native communities are different, the Panel does note that CRC has demonstrated, through its agreements with the Alexis First Nation, that some accommodation of potentially conflicting land uses may be possible. The Panel also notes that the Smallboy Camp has also previously demonstrated an ability to reach a compromise with industrial development, although again recognizing the large differences in scale between oil and gas and coal development. Given that several years must elapse before CRC will be prepared to mine in the Red Cap Creek area, the Panel believes that a real opportunity still exists for CRC and the Smallboy Camp to explore alternative ways in which both their needs could be met. Should the Cheviot Coal Project be approved, the Panel will expect CRC to make substantive efforts to continue its dialogue with the Smallboy Camp to try to find such alternatives.

With regard to the specific concerns raised by Mrs. Young Dave, the Panel notes the commitments made by CRC to continue to liaise with the Smallboy Camp and all its members and the Panel will require CRC to meet those commitments. The Panel also notes the commitments made by CRC to attempt to minimize its effects on traditional uses of the area, and would suggest that the company consider the retention of expert advice in areas such as medicinal plants to help it meet those commitments.

7.4 Hamlet of Cadomin

7.4.1 Views of the Applicant

Both in its application and at the hearing, CRC advised the Panel that through CEPA it had been working closely with the residents of Cadomin to address issues associated with both the existing Luscar mine and the proposed Cheviot Coal Project. As a result, in its view, a large number of issues had been addressed. These included the design and routing of the access corridor around the Hamlet, the protection of water supplies and the appropriate design features of the dams required by the project. CRC stated that it believed that both positive and negative effects on Cadomin would likely be minimal.

Despite these efforts, CRC did note that some areas continued to exist where, in its view, agreement between CEPA and CRC had not yet been reached. One such issue was the possible location of a construction camp at the southern edge of Cadomin. CRC advised the Panel that it may have misunderstood the extent of the community's objections to such camps, due to perceived negative impacts on quality of life. CRC stated that, had it realized the extent of the issue, it believed that it would have been able, through dialogue, to resolve the community's concerns. CRC stated that, notwithstanding its view that there are no significant negative consequences associated with such camps, it was prepared, in discussion with CEPA, to re-evaluate its options with regard to such camps and was confident this issue could be resolved.

7.4.2 Views of the Interveners

CEPA noted in its submission that it was formed in 1989, in response to an application by CRC to mine coal proximal to Cadomin, and that its 123 plus members represented 80 per cent of the residents of Cadomin. CEPA noted that over the years the residents of Cadomin have become largely non-permanent, and use the area largely for its diverse recreational opportunities. Cadomin, it stated, would be impacted by the Cheviot Coal Project as a result of effects on waterways, access routes, and land management changes.

CEPA advised the Panel that it had been working cooperatively with CRC and had, as a result, reached a number of agreements (see Appendices C, D). Furthermore, they submitted to the Panel a number of recommendations to which, they believed, CRC had also largely agreed to undertake. Despite CRC's agreement, however, they asked that these also be included as conditions of any approval issued to CRC in order that they could be enforced. A number of these recommendations, specifically on the bypass access road, water policy, dam construction, soil conservation, land management, and wildlife have been addressed elsewhere in this report. Three remaining issues (i.e. the effects of the construction camps, the need for an advisory committee, and community funding) are discussed below.

With regard to the construction camp, CEPA stated that it was unfortunate that a misunderstanding regarding the need for camps had arisen between itself and CRC. CEPA stated that in its view, the proposed camp would be large relative to the size of the community and would operate for a significant amount of time (up to 16 months). CEPA noted that while such camps may have positive economic benefits for a community, they may also have negative effects including increased traffic and crime. Furthermore, even if such impacts do not occur, the perception of risk can reduce quality of life within the community. CEPA stated that, in its view, such effects had not, based on the information provided at the hearing, been adequately addressed by CRC. In its view, no construction camps at either Cadomin or Mountain Park should be permitted, and construction workers should be transported from Hinton.

CEPA stated that, with regard to any Public Advisory Committee for the Cheviot Coal Project, CRC should also be required to form a separate advisory committee, with only CEPA and CRC as members, and that this should be made a condition of any approval. CEPA also set out a number of specific conditions with regard to this committee, including frequency of meetings, that it felt were appropriate. CEPA also requested that the Panel recommend that CRC assist CEPA with retaining the necessary expert advice on future licences and approvals when these will have an impact on the residents of Cadomin.

7.4.3 Views of the Panel

With regard to the potential environmental effects of the Cheviot Coal Project on the residents of Cadomin, the Panel notes that CRC appears to have carried out an extensive and generally effective consultation process. Furthermore, CRC has clearly made a number of significant changes in its application and a number of commitments in order to address the concerns of the residents. Most of these have been addressed earlier in this report and in general, the Panel is satisfied that no significant environmental effects on the Hamlet of Cadomin will occur.

However, three remaining issues, that is the use and location of construction camps, the establishment of a specific advisory committee between CRC and CEPA, and funding appear to be outstanding.

With regard to construction camps, the Panel does not agree with CEPA that construction camps in either the vicinity of Mountain Park or Cadomin are unacceptable. Based on the evidence provided at the hearing, the Panel is not prepared to make it a requirement of any approval that CRC cannot establish construction camps at either one or both sites. The Panel believes that the use of construction camps in proximity to communities is a well established practice in Alberta, and was not convinced that CEPA's concerns were sufficient to warrant limiting CRC's options in this regard. That said, the Panel will require that CRC continue in its dialogue with CEPA to determine if this issue can be resolved consensually.

With regard to a CEPA-CRC advisory committee, the Panel would expect CRC to honour any commitments it has made to CEPA, including the possible funding of experts. The Panel is not, however, prepared to make it a condition of any approval, that such a committee must be established or that it be funded by CRC. The Panel believes that CRC has made a very significant effort to communicate with CEPA during the course of preparing its application. The Panel also believes that CRC will continue to communicate extensively and effectively with the various affected publics over the life of the Cheviot Coal Project and will expect it to do so. However, for such a process to be truly effective, the Panel believes it must be based on all parties believing that such dialogue represents a net benefit. The Panel is not convinced if one of the parties believes that it has no choice but to participate that this is conducive to effective communications. Furthermore, the creation of such a "regulated" consultation process would almost by definition have a significant risk of reducing its effectiveness.

7.5 Town of Hinton

7.5.1 Views of the Applicant

CRC noted that the Town of Hinton, with a population of 10 000, is located approximately 50 km north-west of the proposed Cardinal River Coal's Cheviot coal mine. Hinton is primarily resource-based, with coal mining, forestry, and pulp and sawmill operations representing the community's economic engines. CRC observed that more than 80 per cent of the miners at the Luscar mine currently live in Hinton.

CRC believed that approval of the Cheviot Coal Project will have positive economic and social benefits for Hinton. These benefits primarily flow from the continued economic and social stability and predictability resulting from the preservation of approximately 400 full-time jobs directly related to the mining operation, which would occur as CRC transferred its labour force from the Luscar mine to the Cheviot mine.

Should the Cheviot Coal Project not be approved, CRC stated that once the coal resources within the Luscar mine were exhausted over the next 5 to 7 years, that the mine would close down. While other economic factors could reduce this effect somewhat, CRC predicted that up to 300 households (900 people) could be lost from the town of Hinton. Associated with this would be

proportionate increases in social and infrastructure costs to the remaining population, including a potential significant drop in real estate values as supply exceeded demand.

7.5.2 Views of the Interveners

The Town of Hinton, the Hinton and District Chamber of Commerce and the Alberta Chamber of Commerce all spoke strongly in favour of allowing the Cheviot Coal Project to proceed, and echoed CRC's descriptions of the economic and social benefits which would occur. Their presentations reiterated the description of the positive benefits of allowing the project to proceed itemized by CRC. These interveners also agreed that a decision to refuse to allow the mine to proceed would have major social and economic costs for Hinton. A number of these groups also suggested that the environmental impacts of the project were mitigable with known technology and that there was therefore a clear public good associated with allowing the project to proceed.

7.5.3 Views of the Panel

During the hearing, very strong support for the Cheviot Coal Project by representatives and citizens of the town of Hinton was evident. The Panel is prepared to accept the evidence, which in general was not challenged, that the failure of the Cheviot Coal Project to proceed will have significant negative social and economic effects on the Town of Hinton, and likely other regional towns such as Edson, as well.

7.6 Regional Community Effects

7.6.1 Views of the Applicant

CRC stated that major economic and related social benefits would accrue to the region, and beyond, if the Cheviot Coal Project were approved. According to CRC, the positive economic effects of the project included job creation during the construction phase; job maintenance for a large number of workers currently employed at the Luscar mine that would otherwise end within several years; spin-off economic benefits for regional businesses and residents; and major revenues for the local, provincial, and federal government. CRC also noted that these benefits would, if the project were denied, become the opportunity costs of not proceeding. CRC believed that the regional economic benefits clearly outweighed the environmental impacts associated with the project.

CRC indicated that the project entails construction activities during 1997–1999 which will inject more than $180 million in 1995 dollars into the regional economy. This construction will also create 585 person–years of direct employment and another 1100 person–years of work indirectly. In addition, during the period 2001–2019, the Cheviot Coal Project would directly maintain approximately 450 person–years of employment annually. CRC also stated that the project would indirectly sustain an additional 690 person–years of work for the full 20–year life cycle of the project. CRC stated that the ongoing employment associated with the mine would infuse more than $54 million (1995 dollars) of household income annually into the regional and provincial economy. CRC estimated that about 57 per cent of this long-term cash flow will go directly to households in the immediate vicinity of the project.

CRC stated that it was prepared to continue to support the Alberta Industrial Benefits Program administered by Alberta Economic Development and Tourism. CRC stressed that it would ensure that Alberta and Canadian engineering firms, contractors, manufacturers, and suppliers receive full and fair opportunity to compete in the supply of goods and services for the Cheviot Mine Project. CRC expected that over 75 per cent of this business would flow to Alberta firms.

CRC predicted that the municipal, provincial, and federal governments would receive about $0.2 million, $17.0 million, and $20 million per year, respectively, in additional revenues from the Cheviot Coal Project. At the hearing, CRC also submitted what it believed was a reasonable estimate of recreational spending in the Mountain Park region which would be foregone, or at least displaced, if the Cheviot Coal Project were to proceed. CRC's analysis suggested that losses would be approximately $350,000 ($260,000 for general recreationalists plus $90,000 for resident and non-resident hunters) and estimated this level of expenditure would generate 10 full time equivalent jobs.

7.6.2 Views of the Interveners

A large number of businesses and groups within the region endorsed the Cheviot Coal Project. As noted in subsection 7.5.2, the Town of Hinton, Hinton and District Chamber of Commerce, and the Alberta Chamber of Commerce stated that they supported the Cheviot Coal Project because they believed that it would yield real net benefits for local municipalities and the region. This group also presented the results of a regional survey signed by 4000+ persons who supported the project.

The pro-project view was shared in the letters of support submitted to the panel by the Regional Municipality of Wood Buffalo and the Towns of Edson, Grande Cache, and Bonnyville. The interveners representing local business groups, municipalities, and the mine workers also voiced concern about the negative economic and social effects of a decision not to proceed with the mine on local communities such as Robb and Cadomin.

Representatives of Weldwood Canada, the largest employer in Hinton, and Inland Cement, which operates near Cadomin, also expressed support for the project and indicated that they foresaw positive gains to the region from the undertaking. These firms also stated that CRC is a very good corporate citizen who contributes to the wellbeing of local communities in a variety of ways, including training local residents in emergency measures for fires, chemical spills, first aid, and mine safety. Weldwood Canada also stressed that CRC's continued presence would have a major stabilizing effect on the economic and social wellbeing of numerous communities within the region. In the view of both companies, CRC had displayed a leadership role in acting as an environmental steward within the local area. Inland Cement cited as an example of CRC's enlightened treatment of environmental issues the company's decision to suspend operations along its haul roads when heavy snows forced bighorn ewes to lamb along company roadways.

The AWA Coalition stated that, in its view, CRC had failed to show how its economic analysis of the benefits of the project could be of use to the Panel without also conducting a social benefit–cost analysis. The AWA Coalition stressed that without an effort to assess the non–market valued resources — such as the value the public places on undisturbed wilderness — it

was not possible to evaluate the true economic and social benefits and costs of the project. In a similar vein, AWA argued that the proponent's failure to properly analyze the economic and social consequences of alternatives to the project deprived the panel of essential information required to determine whether the project is in the public interest.

7.6.3 Views of the Panel

The Panel is prepared to accept in general CRC's estimates of the social and economic benefits of the Cheviot Coal Project as reasonable. The Panel also notes that the Cheviot Coal Project is somewhat unique in so far as, should it be approved, no new social infrastructure costs would be incurred and/or transferred from one portion of the province to another.

The one exception to the above findings was CRC's analysis of the foregone socio–economic benefits associated with not developing the Cheviot Coal Project. The Panel found this analysis to be somewhat superficial. However, the Panel undertook to re–analyse CRC's estimate of foregone benefits ($350 000) from lost recreation and hunting opportunities. In that analysis, the Panel, using publicly available data calculated an upper value of under $600 000 per year in foregone economic activity. However, even assuming that this value still underestimates the lost recreational value of the region by 100 per cent, the Panel was not able to demonstrate to its satisfaction that the foregone economic non-consumptive benefits even approximated the economic benefits of mine development.

8 CONCLUSIONS, DECISIONS, AND RECOMMENDATIONS

8.1 Conclusions

The Panel has carefully reviewed the evidence provided by the parties to the public hearing regarding the Cheviot Coal Project and has reached a number of conclusions. In reaching these conclusions, the Panel has been mindful that the approval process for coal mines in Alberta currently has two stages, with the second licensing stage designed to address in much more detail specific aspects of a project in a manner not possible during the permitting stage. Should this two–stage process be abandoned in the future, then the Panel believes its findings should be revisited in order to ensure that they remain valid.

(1) With regard to the need for and alternatives to the Cheviot Coal Project, the Panel concludes that CRC has established that, subject to receiving the necessary federal and provincial approvals, it has the right to carry out extraction of the coal resources within the applied for mine permit boundary. The Panel believes that CRC has adequately considered other potential sources of metallurgical coal, and that the Cheviot Coal Project provides CRC, from an economic perspective, with an optimal combination of coal reserves, coal quality, and access to infrastructure. The Panel also concludes that, under reasonable economic assumptions, the Cheviot Coal Project is economically viable, and will provide significant economic benefits to both the region and to the province.

With respect to alternative methods of extracting the Cheviot coal reserves, the Panel accepts that surface mining is the optimal method of coal extraction, and that CRC has adequately considered alternative methods. The Panel also concludes that a coal preparation plant and a transportation and utilities corridor are also necessary integral components to the Cheviot Coal Project.

(2) With regard to aquatic environmental effects, the Panel concludes that the Cheviot Coal Project will have a direct impact on water flow rates and water quality both within and beyond the mine permit boundaries. However, the Panel believes that these changes to flow and to water chemistry will not be beyond the normal range of variability in such parameters and the environmental effects will not be significant. The Panel believes that both the rock drain technology and the dam design standards proposed by CRC are reasonable, and that the risk of accidental loss of contaminants is within acceptable limits.

The Panel also concludes that the Cheviot Coal Project will result in both the short–term disruption and permanent loss of fish habitat. The Panel will require CRC, to the extent possible, to avoid or minimize the loss of such habitat. However, where such loss is unavoidable (e.g. in headwater streams covered by external waste rock dumps) the Panel concludes that CRC's proposals to compensate for lost fish habitat are reasonable. Although there are a number of questions remaining regarding the ultimate productivity of end pit lakes, the Panel believes that there is an acceptable probability that they can maintain self–sustaining fish populations. However, the Panel also concludes that CRC should be required at the licensing stage to justify the need for each end pit lake, particularly those not expected to be able to sustain fish populations and, if a lake cannot

be adequately justified, to refill the pit with waste rock. CRC will also be required to establish alternative methods of compensation for lost aquatic habitat should end pit lakes prove to be inadequate.

(3) With respect to terrestrial environmental effects, the Panel concludes that the impacts to soil landscapes, general terrain features, and neotropical breeding birds resulting from surface mining will be significant, but can be justified. The Panel also concludes that impacts to vegetation and other wildlife can, with one notable exception, likely be adequately mitigated, and further, that the predicted impacts can likely be further reduced as mine planning continues. To the extent possible, the Panel will require CRC to minimize surface disturbance and maintain existing vegetation, soil, and terrain features. CRC will also be required to evaluate the possibility of providing wildlife corridors and to confirm, within three years, whether it has been able to successfully initiate the Carnivore Compensation Program.

The exception to the above conclusions is with regard to the vegetation and wildlife values found in the upper Prospect Creek drainage. The Panel does not believe that the economic value of the coal resources in this area, particularly given the high reclamation and transportation costs, are sufficient to justify the loss of large numbers of rare alpine plant species, the potential impacts to wildlife, or the risks to the ecological integrity of the Cardinal Divide Natural Area. The Panel, therefore, has concluded that surface coal mining in all of Section 35–45–24 W5M and in the SW 1/4 of Section 36–45–24 W5M would not be in the public interest. In addition, the Panel believes that all mine development along the base of Tripoli, Cheviot, and Prospect Mountains must be carried out in a manner which continues to permit the unimpeded movement of wildlife along this travel route.

The Panel also strongly recommends that the level of protection for wildlife in the upper Cardinal River be increased. The most effective means of doing so would appear to be to amend the existing PNTs to further restrict motorized access. While the Panel recognizes that this will have some adverse effect on motorized recreation, the direct benefits to the Cheviot Coal Project by increasing the likelihood that the various wildlife mitigation programs will be successful would appear to make these changes highly appropriate. Potential indirect benefits would include: increased watershed protection on the Cardinal River, which was a key issue to both the Alexis First Nation and the Smallboy Camp; additional buffering of Jasper National Park; and additional protection for the Cardinal Divide Natural Area. The Panel would suggest that AEP consider the inclusion of these lands, as well as the upper Prospect Creek lands, into the Cardinal Divide Natural Area, if only to reduce any confusion regarding the level of protection from disturbance that is required to protect their ecological values.

(4) With respect to noise and atmospheric emissions, the Panel concludes that any adverse environmental effects from the Cheviot Coal Project will not be significant.

(5) With regard to land use effects, the Panel concludes that the Cheviot Coal Project is consistent with current provincial land use policy. The Panel also concludes that

development of the Cheviot Coal Project can be carried out in a fashion which preserves the majority of the existing regional land use objectives, including the maintenance of the ecological integrity of the Cardinal Divide Natural Area and Jasper National Park. However, in order to do so, CRC will be required to work closely with provincial and federal land managers and the stewards of the Cardinal Divide Natural Area.

The Panel believes that the one major exception to the above conclusions would be the impacts on current recreational users of the Mountain Park area. In the Panel's view, much of this activity will be displaced to surrounding areas. Without careful management, particularly of access patterns, the Panel believes that these changes in the distribution of recreational activities will have significant effects on a number of other land use objectives, including the success of CRC's mitigation programs for wildlife and the preservation of the ecological values of the Cardinal Divide Natural Area. In particular, the Panel believes that it is unlikely that the necessary control of access can be accomplished without the imposition of some form of regulatory control such as Forest Land Use Zones.

(6) Regarding community effects, the Panel concludes that, on a regional basis, the Cheviot Coal Project will provide significant economic and social benefits, particularly to the Town of Hinton. The Panel also concludes that potential impacts on one aboriginal community, the Alexis First Nation, appear to have been effectively addressed. The Panel does expect that some effects on the Smallboy Camp, given their desire to live outside industrialized society as much as possible, may occur. However, the Panel believes that such impacts may not occur for some time and can potentially be somewhat reduced through ongoing dialogue between CRC and the Smallboy Camp. The Panel also concludes that, with some minor modifications, CRC's proposals to reduce the impacts on the former town of Mountain Park and the Mountain Park cemetery are appropriate.

8.2 Decisions

Having regard for its responsibilities for matters which fall under the mandate of the EUB, the Joint Review Panel has considered all of the evidence and views presented at the hearing and is satisfied that, subject to a number of conditions, Applications No. 960313, 960314, and 960677 meet all of the regulatory requirements and are in the public interest. Accordingly the Panel is prepared to approve the applications subject to the commitments made by CRC and TransAlta and to the following conditions:

(1) All of Section 35-45-24-W5M and the SW 1/4 of Section 36-45-24-W5M are excluded from the mine permit area as proposed by Cardinal River Coals Ltd. in Application No. 960313.

(2) For the purposes of providing a template for the proposed Cheviot mine end pit lakes, CRC shall establish an ongoing program into the aquatic ecology of Lac Des Roche.

(3) CRC shall justify the need for each end pit lake and rock drain on an individual basis to

the satisfaction of the EUB and AEP.

(4) CRC shall establish minimum instream flow values in the drainages directly affected by the Cheviot mine. In consultation with AEP, CRC shall carry out long–term monitoring of groundwater and surface water quality, including appropriate biomonitoring.

(5) CRC will undertake to review available control technologies for metals, nutrients, and other compounds within its settling ponds as well as assess the relevance of current water quality guidelines to its effluent discharges.

(6) CRC will monitor the success of its programs to re–establish native rainbow trout stocks and identify potential alternative areas for habitat enhancement should end pit lakes not prove to be successful.

(7) CRC shall re–examine its mine plan options in the vincinity of Powerhouse Creek and any other area if appropriate to determine in consultation with the EUB and AEP if disturbance of the Englemann spruce–subalpine fir community can be avoided.

(8) CRC will, in consultation with the EUB, continue to refine its mine plan with the goal of maintaining a 1000 m buffer between areas of mine disturbance and the present boundaries of the Cardinal Divide Natural Area wherever practical. In particular, proposed waste rock dumps which currently intrude within this buffer must be re–examined at the appropriate time and their location justified to the EUB. Should the Cardinal Divide Natural Area be expanded, CRC will be required to maximize the distance between mine disturbance and the Cardinal Divide Natural Area to the degree practical, recognizing that the 1000 m buffer likely can no longer be maintained. In consultation with the stewards for the Cardinal Divide Natural Area, CRC will also ensure that no access points are created or that its reclamation programs do not have a negative impact on existing plant communities.

(9) CRC shall advise the EUB on an annual basis regarding the status of the Carnivore Compensation Program and, within three years of receiving approval for the project and before unmitigable impacts have occurred, shall provide evidence of measurable success in establishing the proposed Carnivore Compensation Program.

(10) CRC shall monitor the impacts of its increased traffic on wildlife populations along the Graves Flats Road and make any adjustments necessary to reduce wildlife mortality to acceptable levels.

(11) CRC shall carry out studies needed, in consultation with the EUB, AEP, and Parks Canada, to examine current wildlife movement patterns across the mine site and to establish the likely minimum conditions (e.g. width, degree of cover) necessary for wildlife corridors to be effective, and to establish how such corridors might be accommodated within the mine plan. Ongoing monitoring to identify new mineral licks is also required.

(12) CRC shall monitor changes to public access and use patterns resulting from its development and advise AEP if any of these appear to have unduly increased the risk of wildlife habitat displacement or of either legal or illegal wildlife mortality.

(13) Should CRC locate a construction camp at Cadomin, it shall educate workers regarding the area sensitivity and monitor the Cadomin Caves trail usage by its workers and contractors.

(14) CRC shall employ all reasonable methods available to reduce impacts on Harlequin duck populations, including reducing disturbance levels in riparian areas of the McLeod River, MacKenzie Creek, and Cardinal River watersheds, and continue to monitor these populations.

(15) Prior to commencing any construction work, CRC shall establish Permissable Noise Levels (as defined by the EUB's ID 94-4) with respect to residences in the Hamlet of Cadomin and the Whitehorse Creek Recreational Area and, in discussion with EUB staff, determine if noise monitoring at the Cadomin Caves is appropriate.

(16) CRC shall undertake to pave the west bypass access route provided no significant safety or other concerns are raised by either the regional authorities or the residents of Cadomin.

(17) CRC shall review its mine plan in consultation with the EUB, the Mountain Park Association, and Alberta Culture to establish appropriate buffers, access, and signage for the Mountain Park cemetery and former townsite.

(18) CRC will establish a community liaison group or groups in order to provide interested parties with an opportunity to express concerns, learn about proposed company activities, and receive the results of CRC's various monitoring programs. In particular, CRC will continue its dialogue to the best of its ability with CEPA, the Mountain Park Association, the stewards of the Cardinal Divide Natural Area, the Alexis First Nation, and the Smallboy Camp.

8.3 Recommendations

As per the Terms of Reference for the Joint Review Panel, the Panel has prepared the above final report setting out the rationale for its conclusions regarding the environmental effects of the Cheviot Coal Project. The Panel has concluded that sufficient information was provided for it to be able to determine that the majority of the environmental effects, including socio–economic effects, are either positive or where adverse, are not significant. Where the environmental effects were considered to be adverse and significant, they were generally considered to be justified in the context of the project as a whole. In two cases, for the loss of stream (fish) habitat and the loss of carnivore habitat, compensation for non–mitigable effects was found to be acceptable.

In one case, that is in upper Prospect Creek, the impacts of mine development were considered to be adverse, significant, and not justifiable given the circumstances. However, the Panel, under the authority granted by the mandate of the EUB, has required that this area be excluded from the Cheviot Coal Project, and so the risk of potential adverse environmentals effects has been

addressed.

Based on this, the Panel recommends that the Cheviot Coal Project receive regulatory approval from the Government of Canada. In particular, the Panel recommends that the programs to be required of CRC as mitigation measures under the EUB and AEP approvals be accepted as also adequate to address the requirements under Section 35(2) of the Federal Fisheries Act.

DATED at Calgary, Alberta, on 6 June 1997.

ALBERTA ENERGY AND UTILITIES BOARD
CANADIAN ENVIRONMENTAL ASSESSMENT AGENCY

Brian F. Bietz
Chairman

Gordon J. Miller
Member

Tom Beck
Member

TABLE 1 THOSE WHO APPEARED AT THE HEARING

Principals and Representatives (Abbreviations Used in Report)	Witnesses
Cardinal River Coals Ltd. (CRC)	
D. R. Thomas, Q.C.	W. Hume
A. E. Domes	F. Munn
N. A. Maydonik, Q.C.	A. M. Toutant
	L. LaFleur
	B. Logan
	R. Ferster
	M. Evans
	R. Karst
	P. Sagert
	W. Veldman
	F. Claridge
	T. Dabrowski
	A. Stewart
	M. Thompson
	R. Morin
	M. LeBlanc
	M. Harris
	G. Potolicki
	C. Brinker
	B. MacCallum
	S. Herrero
	D. Walker
	O. Bakowski
	W. Strong
	J. Gendron
	L. Knapik
	A. Wolanski
	J. Allan
	M. Kavanagh
	D. Birkholz
	D. Davies
	U. Klee
	B. Ramsey
	D. Whicker
	K. Hale
	D. Davies
	G. Fedirchuk

TABLE 1 THOSE WHO APPEARED AT THE HEARING (cont'd)

Principals and Representatives (Abbreviations Used in Report)	Witnesses
TransAlta Utilities Corporation (TransAlta)	
C. J. Meagher	R. V. Howland
D. C. Maxwell	D. W. Walters
J. Dixon	
C. Journault	
Canadian National Railway Company (CNR)	
M. A. King	
Inland Cement	
T. McDougall	R. Moss
Weldwood Canada	
T. Whitford	T. Whitford
Hinton and District Chamber of Commerce	
C. Mork	B. Deal
	C. Mork
Alberta Chamber of Commerce	
N. Leach	N. Leach
C. Mork	
United Mine Workers of America, Local 1656 (UMWA)	
G. K. Randall, Q.C.	R. Campbell
	B. Bish
	S. Whiteley
	P. Nichols
Town of Hinton	
Mayor R. Risvold	Mayor R. Risvold
	P. Nichols
	B. Kreiner
D. Van Binsbergen, MLA for West Yellowhead (himself)	
C. Breitkreuz, MP Yellowhead (himself)	C. Breitkreuz
	L. Best

TABLE 1 THOSE WHO APPEARED AT THE HEARING (cont'd)

Principals and Representatives (Abbreviations Used in Report)	Witnesses
Alexis First Nation	
J. Slavik	Chief R. Alexis
	Councillor B. Alexis
	Councillor N. Alexis
Cadomin Environmental Protection Association (CEPA)	
R. M. Kruhlak	C. Way
	J. Kupper
	P. Bell
	D. Howery
Alpine Club of Canada/Alberta Native Plant Council (Alpine Club Coalition)	
G. Lewis	A. Smreciu
A. Dinwoodie	E. Beaubien
	T. Pike
	A. Dinwoodie
Mountain Park Environmental Protection and Heritage Association (Mountain Park Association)	
M. Bracko	M. Bracko
Alberta Wilderness Association, Jasper Environmental Society, Pembina Institute for Responsible Development, Canadian Parks and Wilderness Society, and Ben Gadd (AWA Coalition)	
J. Klimek	B. Gadd
D. Pachal	C. Wershler
	C. Wallis
	D. Pachal
	R. Notnes
	S. Gunsch
	J. Seaton
	C. Baker
	R. Hornung

TABLE 1 THOSE WHO APPEARED AT THE HEARING (cont'd)

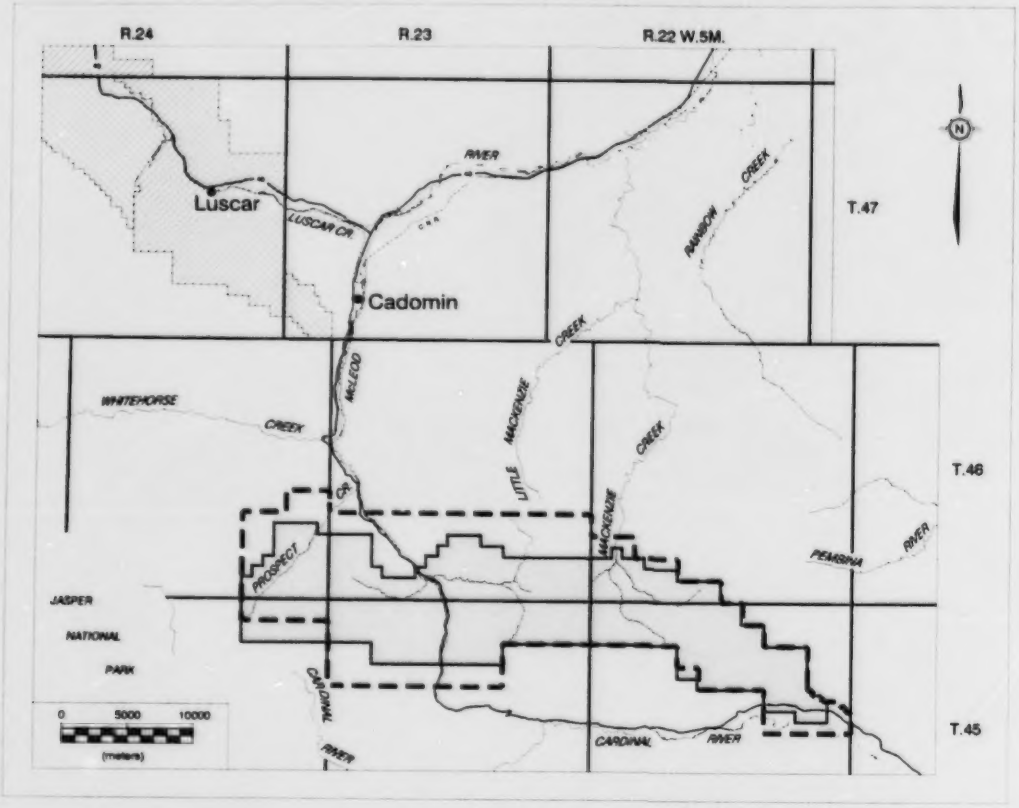
Principals and Representatives (Abbreviations Used in Report)	Witnesses
Alberta Fish and Game Association	
A. Boyd	A. Boyd
Trout Unlimited	
K. Brewin	N. Rodseth
	K. Brewin
	W. Mackay
	G. Mitchell
Rocky Mountain Ecosystem Coalition (RMEC)	
M. Sawyer	M. Sawyer
	D. Mayhood
Western Canada Wilderness Committee (WCWC)	
G. Jones	G. Jones
Smallboy Camp	
M. Nadeau	M. Nadeau
B. Parry	B. Parry
Dave Family	
J. Smallboy	Mistisquoi Young Dave
	Jessie Smallboy
	Eleanor Smallboy
J. D. Clark (himself)	
Mrs. B. Higgins (herself)	
Government of Canada	
P. Hodgkinson	G. Linsey
S. Faulknor	R. Tupper
G. Linsey	J. Shaw
U. Tauscher	J. Fleury
	P. Hale
	B. Stewart
	L. Jackson
	R. Newstead

TABLE 1 THOSE WHO APPEARED AT THE HEARING (cont'd)

Principals and Representatives (Abbreviations Used in Report)	Witnesses
	T. Swerdfager
	P. Galbraith
	D. Rosenberg
	D. Bodaly
	F. Schneider-Viera
	I. Goudie
	P. Clarkson
	G. Holroyd
	J. Weaver
	G. Mercer
	W. Bradford
	S. Cardiff
	T. Tremblay
Alberta Environmental Protection (AEP) and Alberta Community Development	
S. Rutwind	R. Stone
R. Bodnarek	L. Hurt
	D. Bratton
	D. Cox
	K. Smith
	T. Mill
	J. Nagendran
	C. Hunt
Alberta Energy and Utilities Board staff	
R. Creasey	
B. Heggie	
R. Girvitz	
K. Gladwyn	
R. King	
T. Walden	
R. Marsh	
K. Nichol	
B. Paterson	
Panel Secretariat	
D. Henderson	
M. Lascelles	

FIGURE 1
Location Plan of the Cheviot Mine Project
Cardinal River Coals Ltd.

Acknowledgement
Cardinal River Coals Ltd



LEGEND

- CHEVIOT MINE PROJECT AREA
- LUSCAR MINE PERMIT AREA
- CHEVIOT MINE PERMIT AREA (PROPOSED)
- GREGG RIVER RESOURCES LTD.

Acknowledgement:
Cardinal River Coals Ltd.

FIGURE 2
Proposed Cheviot Mine Permit Area
Cardinal River Coals Ltd.

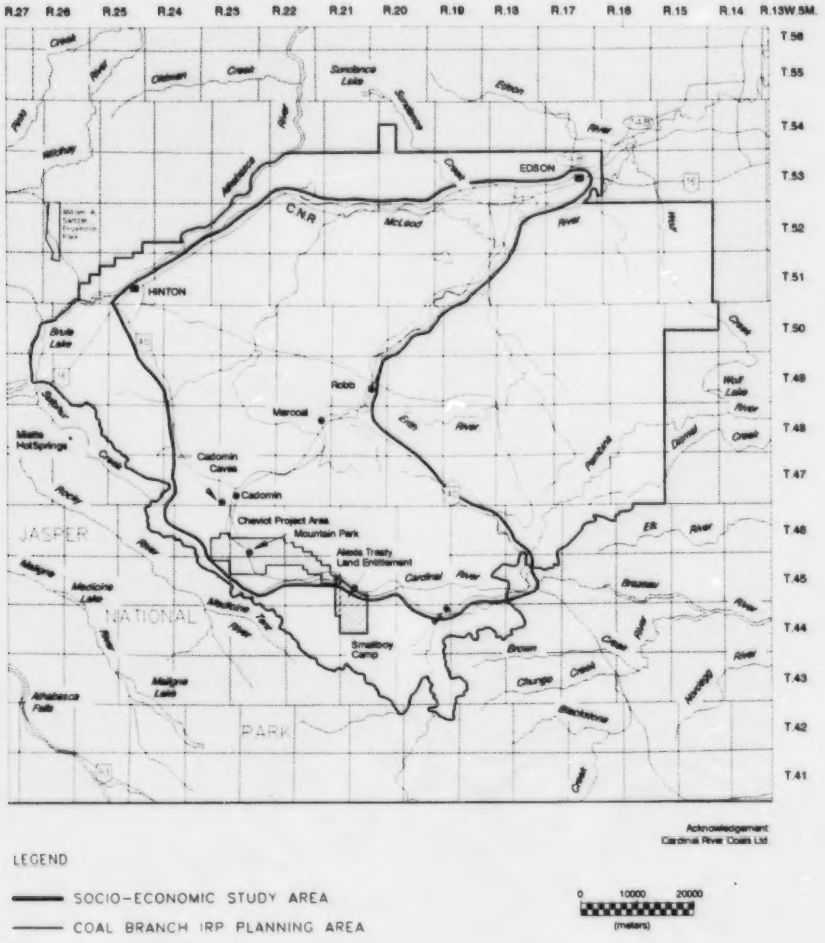
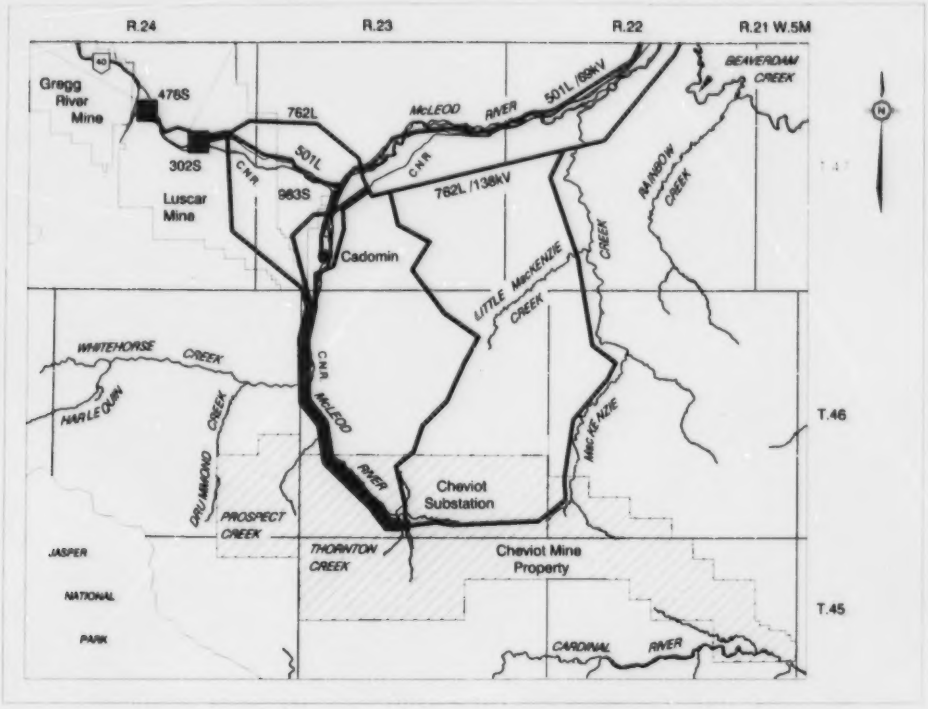


FIGURE 3
Location of Communities Associated with
the Cheviot Coal Project
Cardinal River Coals Ltd.



Acknowledgement:
TransAlta Utilities Ltd

LEGEND

- EXISTING TRANSMISSION LINE ROUTES
- LUSCAR MINE ROUTE
- CADOMIN WEST BYPASS ROUTE
- CADOMIN EAST BYPASS ROUTE
- LITTLE MACKENZIE CREEK ROUTE
- MACKENZIE CREEK ROUTE
- HIGHWAY 40
- COAL MINE BOUNDARY
- C.N.R.
- PROPOSED SUBSTATION SITE
- EXISTING SUBSTATION
- CHEVIOT MINE PROJECT AREA

FIGURE 4
Transmission Line Routing Alternatives
Cardinal River Coals LTD.

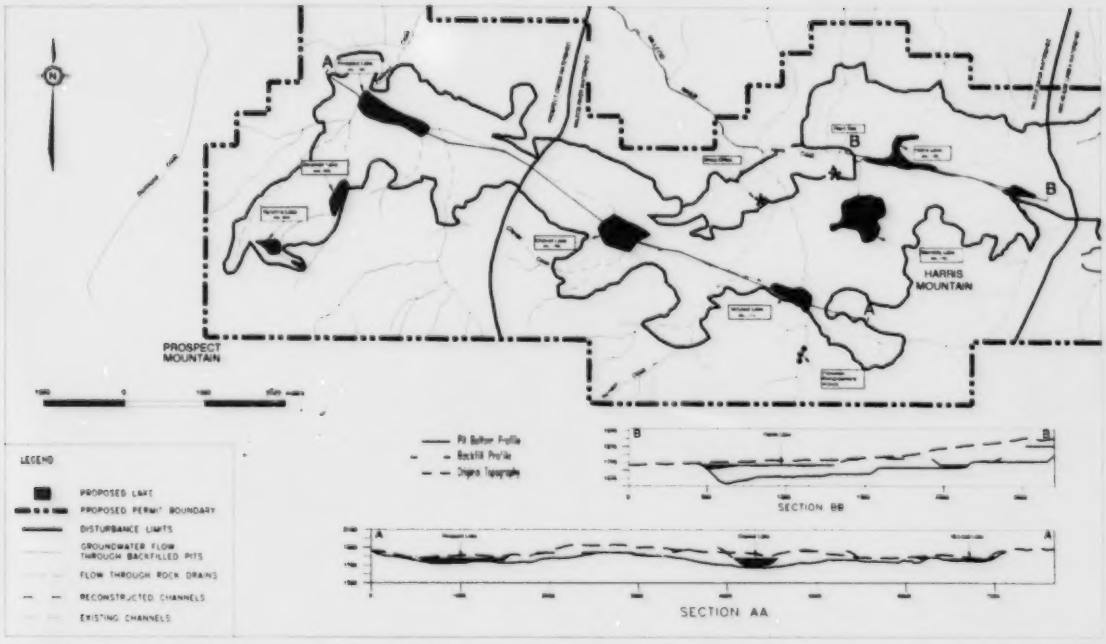


FIGURE 5 (West Half)
Post Mining Drainage and Lake Development Plan
Cardinal River Coals LTD.

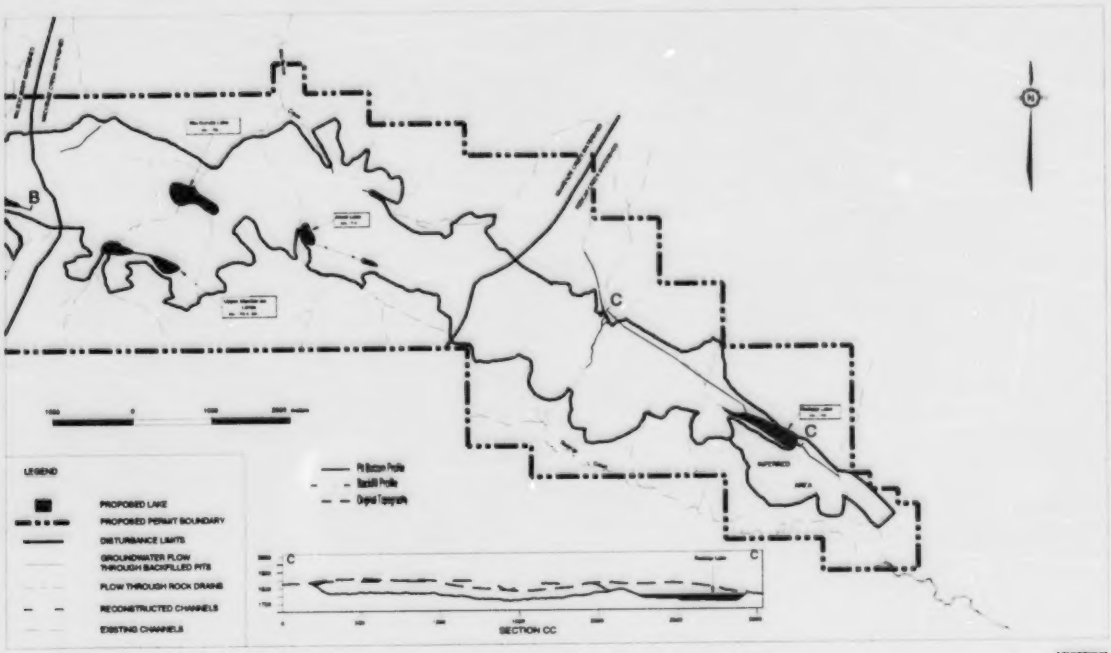
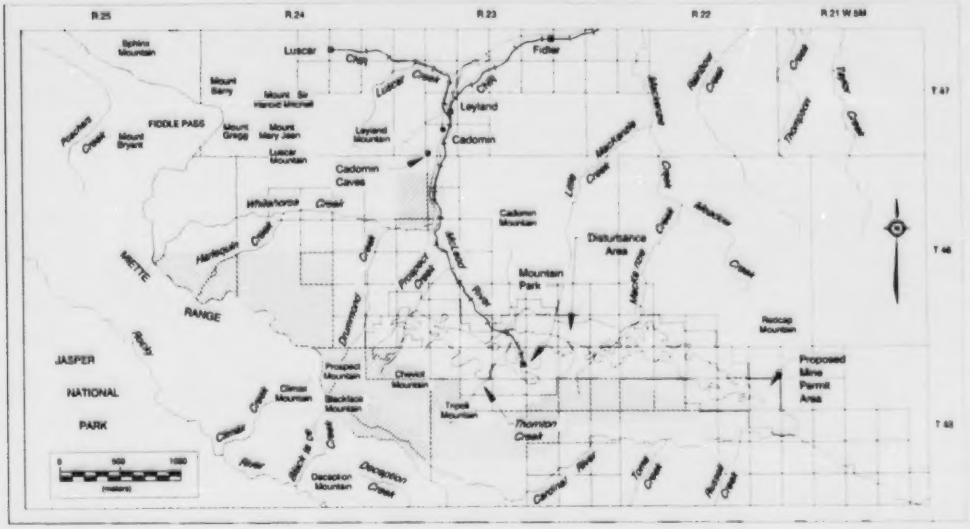


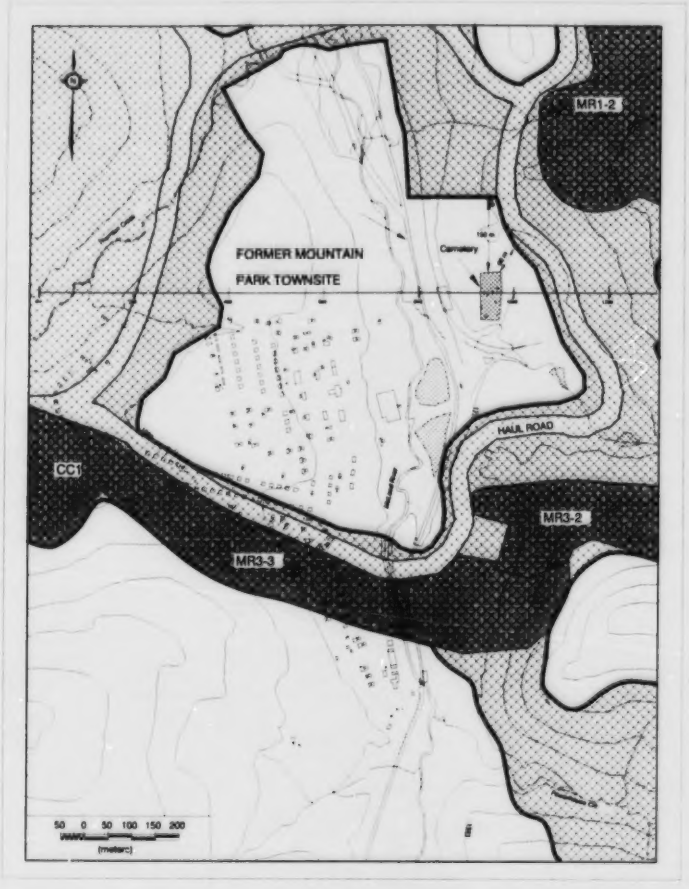
FIGURE 5 (East Half)
Post Mining Drainage and Lake Development Plan
Cardinal River Coals LTD.



LEGEND

- CARDINAL RIVER DIVIDE NATURAL AREA
- PNTs
- PROPOSED CHEVIOT MINE PERMIT AREA

FIGURE 6
Cheviot Coal Project
Cardinal Divide Natural Area and Associated PNTs
Cardinal River Coals Ltd.



Acknowledgement
Cardinal River Coals Ltd

LEGEND

- PIT & DUMP LIMITS
- PIT AREAS
- ROCK DUMP AREAS
- DISTURBANCE AREA
- POTENTIAL SETTLING PONDS

FIGURE 7
Buffer Zone for Mountain Park Cemetery
Cardinal River Coals Ltd.

ALBERTA ENERGY AND UTILITIES BOARD
Calgary Alberta

PRE-HEARING MEETING
APPLICATION BY CARDINAL RIVER COALS LTD. AND TRANSALTA UTILITIES CORPORATION
FOR THE CHEVIOT COAL PROJECT
IN THE HINTON AREA

Memorandum of Decision
Application Nos. 960313, 960314, and 960677

1 INTRODUCTION

On 21 September 1996 the Alberta Energy and Utilities Board (the Board) set down the above applications for a public hearing scheduled for 25 November 1996. That notice also advised parties that the Board anticipated that a joint federal/provincial review panel would likely hear and decide on the applications made by Cardinal River Coals Ltd. (Cardinal). Subsequent to issuing that notice, the Board was made aware of concerns by various interested parties about the hearing process and the timing of the public hearing.

In order to address these concerns, a Pre-Hearing Meeting was held in Hinton, Alberta on 5 November 1996 before Board Members Dr. Brian Bietz and Mr. Gordon Miller. A list of those who registered at the Pre-Hearing Meeting is shown on the attached table.

2 ISSUES

The Board believes that three issues arose from the meeting. These are:

the timing of the public hearing,

the availability of intervener funding, and

the joint review panel process.

Each issue is discussed below.

2.1 Timing

2.1.1 Views of the Parties

Cardinal stated that it was ready to proceed to a hearing on the scheduled date of 25 November 1996 and that to delay the hearing would be unfair. The company argued that it had carried out extensive public consultation and that the majority of its application had been available for public review since the summer of 1996. As a result, the applicant argued that anyone with an interest in the project had had more than enough time to prepare for the hearing. Cardinal also suggested that delays in the hearing could, assuming the Cheviot Coal Project was approved,

result in significant construction delays and both short and long term costs to the company and the community. Cardinal's position was supported by Canadian National Railway, the Hinton and Alberta Chambers of Commerce, the Town of Hinton, the United Mine Workers of America (Local 1656), Mr. Van Binsbergen, MLA and the Alexis First Nation. TransAlta Utilities Corporation, the Cadomin Environmental Protection Association, the Alberta Government and the Federal Government neither supported nor disputed the position of Cardinal but did advise the Board that they were also prepared to proceed on 25 November 1996.

The remaining parties generally disagreed with Cardinal's view that the hearing should proceed as scheduled. Suggested delays ranged from three weeks to several months, years or indefinitely. Reasons given for the need for a later hearing date included: the receipt of federal funding only in late October plus the receipt of significantly less federal funding than requested, resulting in problems in carrying out the review; difficulties in finding and retaining appropriate experts; some difficulties in receiving needed documentation; and the availability of significant portions of the application only since mid-September. A general view stated by several parties was that, given the size of the proposed development, the volume of material in the application and the number of issues to be addressed, it was reasonable for interveners to require a proportionate amount of time to adequately prepare for a hearing.

Views of the Board

The Board accepts that a delay in the holding of a scheduled hearing creates a burden for an applicant, and that an overly long delay in scheduling a hearing is inherently unfair. Equally unfair, however, is expecting potentially affected individuals to prepare for a hearing in a very short period of time, particularly when an application is relatively large or complex. Clearly, a compromise between these two sets of needs is required to ensure fairness to both parties.

In this case, the Board is prepared to accept the views of interveners that some additional review time is needed. However, the Board also agrees with Cardinal that there has already been a significant amount of time available to prepare for a hearing. Therefore, the Board has rescheduled the hearing to 13 January 1997 and extended the intervention submission date to 7 January 1997.

2.2 Intervener Funding

Views of the Parties

Several interested parties commented on what they perceived as insufficient federal intervener funding. Others questioned what they referred to as the EUB process for granting funding and suggested that the existing EUB process for determining eligibility for intervener funding was inadequate.

Views of the Board

The Board wishes to emphasize that the intervener funding process established by the Canadian

Environmental Assessment Act (CEAA) for joint review panels has clearly separated the federal funding process from the authority and responsibilities of this panel. Therefore, the Board is unable to comment on the adequacy of federal funding process.

With regard to the EUB funding process, the existing legislation sets out the tests that a Division of the Board must use in assessing eligibility for funding. The Division must make its funding decisions within the boundaries set out by those statutory requirements. The Board in this case is prepared to consider any costs application made and will make its decisions based on the merits of each claim, within the spirit and intent of the EUB legislation as well as the agreements constituting the joint review process. Parties who feel they may be eligible for costs are encouraged to obtain a copy of the Board's Guidelines for Intervener Funding.

2.3 Joint Review Panel Process

2.3.1 Views of the Parties

At the hearing it was argued by the Rocky Mountain Ecosystem Coalition (RMEC) that, in the absence of the federally nominated panel member, no joint review panel could be initiated and so the Pre-Hearing Meeting should be adjourned. RMEC noted that while two members of such a panel could constitute a quorum once the panel had been formed, the joint review panel itself did not yet exist and so it was not possible to create a quorum. RMEC also concluded that the agreement between the EUB and the Canadian Environmental Assessment Agency on behalf of the Federal Minister of Environment for a Joint Review Panel (signed 24 October 1996) may not be properly constituted since certain requirements, primarily hearing scope and panel terms of reference under the CEAA could not be delegated by the Minister. Cardinal disagreed with the views expressed by RMEC and argued that a joint review panel did exist, since both Board members had been appointed by the Federal Minister as members of a joint review panel.

Although they did not challenge the legal authority of the panel at the Pre-Hearing Meeting, a number of parties did express their concern over the absence of the federal appointee as a third panel member. A number of parties also indicated a preference for a panel made up of an equal number of federal and provincial nominees.

2.3.2 Views of the Board

The Board notes that the 24 October 1996 agreement between the EUB and the Federal Minister of Environment to carry out a joint review was developed in accordance with the 1993 Canada/Alberta Agreement for Environmental Assessment Cooperation and the subsidiary agreement for establishing Joint Review Panels. The Board believes that these agreements recognize that for some projects both Canada and Alberta will have regulatory authority but that the degree of authority may differ. In this specific case, provincial regulatory authority is significant, requiring approval of all aspects of the proposed Cheviot Coal Project. Federal authority is somewhat more limited, and is related generally to the alteration or destruction of fish habitat. Notwithstanding the relative role of the two levels of government, the agreement recognizes that it is to the advantage of all parties, government, applicant and the public alike if a

single, combined review process can be achieved. However, the agreement also recognizes that such harmonization may not be possible in some cases. In those cases, the regulatory requirements of the two levels of government must still be met and so dual processes will occur.

The Board agrees that if a joint federal/provincial review eventually occurs, it will be preferable to have the complete joint review panel in place as soon as possible. It is certainly not the Board's intention to proceed to hearing until either the joint review panel has been put in place or alternatively, it is clearly determined that a joint review cannot be accomplished and each regulatory authority must meet its obligations independently.

However, in this case, the Board was faced with dealing in a timely fashion with concerns raised regarding the timing of an EUB hearing scheduled for 25 November 1996. The Board therefore determined that the public interest was best served by holding a Pre-Hearing Meeting under the authority granted by the Alberta Energy and Utilities Board Act. While the Board understands how this may have led to some confusion, the Board remains convinced that the public interest was best served by the holding of the Pre-Hearing Meeting prior to the proposed EUB submission and hearing date rather than delaying until the appointment of the third panel member for a proposed joint review panel could be accomplished.

The Board agrees with the position of the RMEC that the joint federal/provincial review should not begin until all of the requirements under the 24 October 1996 agreement are in place. The Board does not accept the RMEC's argument that the Federal Minister of the Environment could not delegate his authority to enter into the 24 October 1996 agreement. Section 28 of the 1993 Canada-Alberta Agreement clearly contemplates such delegation.

Once the final member of the joint review panel has been appointed, it is the Board's view that the joint review panel is obliged to meet and either adopt and confirm the decisions which have been made to date solely under the EUB process or alternatively, publicly advise the interested parties as to the process the joint review panel intends to follow.

DATED at Calgary, Alberta on 27 November 1996.

Brian F. Bietz, Ph.D., P.Biol.
Board Member

Gordon Miller
Board Member

THOSE WHO APPEARED AT THE PRE-HEARING MEETING

Participants	Representatives
Cardinal River Coals Ltd.	D. R. Thomas A. E. Domes N. A. Maydonik
TransAlta Utilities Corporation	D. Maxwell
Hinton Chamber of Commerce	B. Deal
Alberta Chamber of Commerce	N. Leach
United Mine Workers of America Local 1656	G. K. Randall
Town of Hinton	R. Risvold
Cadomin Environmental Protection Association	R. M. Kruhlak
Cadomin Environmental Protection Agency	J. Slavik
Department of Justice (Alberta)	S. Rutwind
Department of Justice (Canada)	S. Faulknor
Canadian National Railway Company	M. A. King
Alberta Wilderness Association and Jasper Environmental Society	D. Pachal
Mountain Park Environmental Protection and Heritage Association	M. Bracko
Alpine Club of Canada and Alberta Native Plant Council	A. Dinwoodie
Mother Earth Healing Society	L. Sinclair C. Hughes
MLA West Yellowhead	D. Van Binsbergen
Trout Unlimited	K. Brewin

THOSE WHO APPEARED AT THE PRE-HEARING MEETING (cont'd)

Participants	Representatives
Pembina Institute	C. Baker
Western Canada Wilderness Committee	G. Jones
Peter O'Chiese	K. Cunningham Peter O'Chiese
Edmonton Chapter of Canadian Parks and Wilderness Society	S. Gunsch
Rocky Mountain Ecosystem Coalition	M. Sawyer
Alberta Energy and Utilities Board	D. Henderson R. Girvitz
Canadian Environmental Assessment Agency	M. Lascelles

Appendix B

AGREEMENT

Between

Alberta Energy and Utilities Board

-and-

The President of the Canadian Environmental Assessment Agency

on behalf of The Federal Minister of the Environment

Concerning

The Panel for the Cheviot Coal Project

WHEREAS:

1. Cardinal River Coals Ltd. has proposed a project to develop the Cheviot Coal Project;

2. The Cheviot Coal Project requires an approval from the Alberta Energy and Utilities Board and is subject to an assessment under the Canadian Environmental Assessment Act and has been determined to require a public review by a panel;

3. The Government of the Province of Alberta and the Government of Canada established a framework for conducting joint reviews with the Canada-Alberta Agreement for Environmental Assessment Cooperation of 6 August 1993; and

4. The Alberta Energy and Utilities Board and the Government of Canada have determined that a joint panel review of the Cheviot Coal Project will ensure that this project is evaluated according to the spirit and requirements of their respective authorities while avoiding unnecessary duplication, delays and confusion that could arise from separate reviews;

THEREFORE, the Alberta Energy and Utilities Board and the President of the Canadian Environmental Assessment Agency, acting for the Federal Minister, agree to establish a joint review panel for the Cheviot Coal Project in accordance with the following provisions:

1. **Definitions**

"**Agency**" means the Canadian Environmental Assessment Agency.

"**CEAA**" means the Canadian Environmental Assessment Act.

"**Cheviot Coal Project**" refers to the project proposed by Cardinal River Coals Ltd., located south of Hinton, Alberta and includes the construction, operation, and decommissioning of a coal processing plant, the development, operation, and reclamation of an open pit coal mine, the restoration of the Mountain Park sub-division rail line, upgrading of the existing access road into the Cheviot Mine area, and the installation of a new transmission line, and substation to supply electrical power to the Cheviot Mine.

"**Environment**" means the components of the earth, and includes

(a) land, water and air, including all layers of the atmosphere;
(b) all organic and inorganic matter and living organisms; and
(c) the interacting natural systems that include components referred to in paragraphs (a) and (b).

"**Environmental Effect**" means, in respect of the Cheviot Coal Project:

(a) any change that the Cheviot Coal Project may cause in the Environment, including any effect or cumulative effect of any such change on health and socio-economic conditions, on physical and cultural heritage, on the current use of lands and resources for traditional purposes by both aboriginal and non-aboriginal persons, or on any structure, site or thing that is of historical, archeological, paleontological or architectural significance; and

(b) any change to the Cheviot Coal Project that may be caused by the Environment;

whether any such change occurs within or outside Canada.

"**EUB**" means the Alberta Energy and Utilities Board.

"**Federal Authority**" refers to such an authority as defined in CEAA.

"**Federal Minister**" refers to the federal Minister of the Environment.

"**Final Report**" is the document produced by the Panel which contains its rationale, conclusions and recommendations regarding the Cheviot Coal Project environmental assessment; and which includes the Panel's decisions pursuant to the Energy Resources Conservation Act and the Panel's conclusions and recommendations pursuant to CEAA.

"**Follow-up program**" means a program for

(a) verifying the accuracy of the environmental assessment of the Cheviot Coal Project; and
(b) determining the effectiveness of any mitigation measures.

"**Mitigation**" means, in respect of the Cheviot Coal Project, the elimination, reduction or control of the adverse Environmental Effects of the project, and includes restitution for any damage to the environment caused by such effects through replacement, restoration, enhancement or any other means.

"**Panel**" refers to the joint EUB/CEAA panel established by this agreement.

"**Responsible Authority**" refers to such an authority as defined in CEAA.

2. Establishment of the Panel

2.1 A process is hereby established to create a Panel, pursuant to Section 23 of the Energy Resources Conservation Act and Sections 40, 41 and 42 of the CEAA, for the purposes of the review of the Cheviot Coal Project.

2.2 The EUB and the Agency will make arrangements to accommodate the announcements of a joint review of the Cheviot Coal Project by both Alberta and Canada.

2.3 This agreement shall be subject to any and all applicable terms and conditions set out in the Subsidiary Agreement on Joint Review Panels that forms part of the Canada-Alberta Agreement for Environmental Assessment Cooperation.

3. Constitution of the Panel

3.1 The Panel will consist of three members. Two members, including the Panel Chair, will be selected directly by the Chair of the EUB and will be approved by the Federal Minister. One Panel member shall be selected by the Federal Minister in accordance with section 3.2.

3.2 The Federal Minister will appoint the third Panel member as follows: the Minister will select two or more individuals to serve as potential Panel members and will communicate the names of those individuals to the Government of Alberta. The Chair of the EUB will then select one candidate to serve as a Panel member for the purpose of conducting the Panel review. The federal nominee found to be acceptable as an acting EUB member will be appointed by the Alberta Lieutenant

Governor in Council and will be appointed by the Federal Minister as a member of the Panel pursuant to S. 41(a) of CEAA.

3.3 The Panel members shall be unbiased and free from any conflict of interest relative to the Cheviot Coal Project and are to have knowledge or experience relevant to the anticipated environmental effects of the project.

4. Conduct of Assessment by the Panel

4.1 The Panel shall conduct all public hearings and/or meetings in a manner that discharges the responsibilities of a division of the EUB under the Alberta Energy and Utilities Board Act and Energy Resources Conservation Act and in a manner that discharges its responsibilities under CEAA.

4.2 All Panel hearings shall be public and the review will provide for full public participation.

4.3 The Panel shall conduct its review in accordance with the Terms of Reference in Schedule I approved by the President of the Canadian Environmental Assessment Agency on behalf of the Federal Minister.

4.4 The Panel shall have all the powers described in Section 35 of the CEAA.

5. Secretariat

5.1 Administrative, technical, and procedural support requested by the Panel shall be provided by a Secretariat, which shall be the joint responsibility of the EUB and the Agency.

5.2 The Secretariat will report to the Panel and will be structured so as to allow the Panel to conduct its review in an efficient and cost-effective manner.

5.3 The EUB will provide its offices for the conduct of the activities of the Panel and the Secretariat.

6. Record of Joint Review and Final Report

6.1 A public registry consisting of all submissions, correspondence, hearing transcripts, exhibits and other information received by the Panel and all public information produced by the Panel relating to the review of the Cheviot Coal Project will be maintained by the Secretariat during the course of the review in a manner that

provides for convenient public access, and for the purposes of compliance with section 55 of CEAA. This registry will be located in the offices of the EUB.

6.2 On completion of the assessment of the Cheviot Coal Project, the Panel will prepare a Final Report setting out its rationale, conclusions and recommendations.

6.3 Once completed, the Final Report will be conveyed concurrently to the Federal Minister, Responsible Authority and the public.

6.4 Once the Final Report is released, the responsibility for the maintenance of the public registry will be transferred to the Responsible Authority. The responsible authority will maintain the public registry in a manner that will provide convenient access to this material by the Agency, other government departments and the public.

7. Other Government Departments

7.1 At the request of the Panel, Federal Authorities having specialist knowledge with respect to the Project will provide available information and knowledge in a manner acceptable to the Panel.

7.2 Nothing in this agreement will restrict the participation by way of submission to the Panel by other federal or provincial government departments or bodies, subject to section 7.1, above, and Section 12(3) of the CEAA.

8. Participant Funding

8.1 Decisions regarding advanced participant funding by the Agency under the federal Participant Funding Program, and decisions on intervenor funding by the EUB will, to the extent practicable, take into account decisions of the other party.

9. Amending this Agreement

9.1 The terms and provisions of this agreement may be amended by written memorandum executed by both the President of the Canadian Environmental Assessment Agency on behalf of the Federal Minister and the Chair of the EUB.

10. Signatures

In witness thereof this agreement is executed and delivered as of the 24th day of October, 1996

Alberta Energy and Utilities Board

Céline Bélanger

Céline Bélanger, Chair

The Canadian Environmental Assessment Agency

Michel Dorais, President

Schedule I
Terms of Reference for
the Panel of the Cheviot Coal Project

General

1. The Panel will review the proposed construction, operation, decommissioning and abandonment of the Cheviot Coal Project.

Factors for review

2. The Panel will include in its review of the Cheviot Coal Project consideration of the factors identified in Appendix 1. The Joint Review Panel's consideration of the factors listed in Appendix 1 shall be reflected in the Final Report.

Hearing

3. The Panel will conduct the review by way of an oral hearing.

Information to be made available

4. The Panel will ensure that all information required for the conduct of its review is obtained and made available to the public, which will include, but is not necessarily limited to:
   a) existing technical, environmental or other information relevant to the review, including documents filed in connection with applications No. 960313, and 960314 to the EUB and comments and critique on these documents,
   b) supplementary information including a description of any public consultation program, its nature and scope, issues identified, commitments made, and outstanding issues,
   c) the terms of reference for the EIA, dated January 23, 1995, for the Cheviot Coal Project and documentation generated by the proponent, and other interested parties, in response to these terms of reference,
   d) any other available information that is required to assess the significance of the Environmental Effects.

5. The Panel shall be guided by the Agreement for the Cheviot Coal Project and the relevant federal and provincial legislation in following its terms of reference.

Appendix 1
FACTORS TO BE CONSIDERED FOR THE REVIEW

For the purposes of the EUB, the Panel shall determine whether the Cheviot Coal Project is in the public interest, having regard to the social and economic effects of the project and the effects of the project on the environment and shall consider but not be limited to the factors itemized below. These factors will also be considered by the Panel in developing and substantiating conclusions and recommendations for federal decision makers:

1. The purpose of, need for, and alternatives to the Cheviot Coal Project;

2. The Environment, including the socio economic environment, which may reasonably be expected to be affected by the Cheviot Coal Project;

3. The Environmental Effects of the Cheviot Coal Project including the Environmental Effects of malfunctions or accidents that may occur in connection with the Cheviot Coal Project and any cumulative Environmental Effects that are likely to result from the Cheviot Coal Project in combination with other projects or activities that have been or are likely to be carried out;

4. The Environmental Effects of the Cheviot Coal Project to be considered include, but are not limited to, impacts on: aboriginal and non-aboriginal land use and related interests; fauna and flora; water quality; and fish and fish habitats especially due to the replacement of headwater stream habitat by lakes and reservoirs;

5. The temporal and spatial boundaries and the significance of the Environmental Effects of the Cheviot Coal Project;

6. Measures that are technically and economically feasible which would mitigate any significant Environmental Effects of the Cheviot Coal Project;

7. The need for, and requirements of, follow-up and monitoring programs for the Environmental Effects of the Cheviot Coal Project;

8. Alternative means of carrying out the Cheviot Coal Project that are technically and economically feasible and the Environmental Effects of any such alternative means;

9. The capacity of renewable resources that are likely to be significantly affected by the Cheviot Coal Project to meet the needs of the present and those of the future; and

10. Comments from the public and government agencies.

Appendix C

MUNICIPAL DISTRICT OF YELLOWHEAD NO. 94

2716 - 1st Avenue, Edson, Alberta, Canada T7E 1N9 Telephone 403-723-4800 Fax 403-723-5066

January 9, 1997

Mr. Fred Munn
Cardinal River Coals Ltd.
Bag 2570
Hinton, Alberta
T7V 1V5

Dear Fred:

RE: CHEVIOT MINE PROJECT - CADOMIN BYPASS ROAD

At the meeting between Cheviot and the Municipal District on December 5th, 1996, the alignment of the Cadomin Bypass was discussed. There was agreement with the alignment with the exception of the portion affecting the Winters' property and how that may effect the railway crossing. You indicated that some time was required to negotiate a resolution to the Winter's issues prior to finalizing the alignment.

My understanding is that you have now reached consensus with the Winters and would like concurrence from the Municipal District on the solution. The solution being proposed is that the route be moved approximately 100 meters north of the previous proposal. The effect of this change would be that the angle of the road in relation to the railway crossing would be reduced from a desired 75 degree angle to a 60 degree angle. Although ultimate approval rests with Council, the administration is prepared to recommend the changes being proposed.

The Province has overriding legislation that simply says that if the project is approved by the Provincial regulators, the Municipal District must issue a development permit. The issue of the road alignment and specifications are part of the developers agreement negotiated with the Municipal District as a condition of the issuance of a development permit if and when the Cheviot Project receives Provincial approval.

I trust this information will provide the Winters with some degree of comfort related to their road issues.

Yours truly,

Terry Broome
Municipal Manager

/TB

cc: M.D. #94 Council
Cadomin Environmental Protection Assoc.
Allen & Glenna Winter

CHEVIOT MINE
CARDINAL RIVER COALS LTD.

BAG SERVICE 2570, HINTON, ALBERTA, CANADA T7V 1V5
PHONE: (403) 692-5190 FAX: (403) 692-5192

9 January 1997

Mr. A. Winter
C/O Telus
Floor 20,
10020 - 100 Street
Edmonton, Alberta
T5J 0N5

Dear Al:

Re: Cheviot Mine Project - ByPass Road

As per our phone conversation of Monday, January 6th, 1997, please accept our apologies for the delay in providing you with a map showing the proposed ByPass Road route adjacent to your property. We anticipate that the map will be ready in the near future; hopefully before the start of the hearings. In the event that the map is not available at that time, this letter will serve to confirm that CRC is committed to moving the road alignment further north of your property. Even though we do not have a map that shows the exact road alignment at this time, we wish to reassure you that the rail crossing will be located, at or north of, the location of route "G" that was discussed in our meetings since November 29, 1996. As we discussed, movement of the road would be contingent upon CRC obtaining regulatory approval to have the railroad crossing reduced from the standard 75° angle. Based on discussions with the regulatory authorities we are of the understanding that this should not pose a problem. Please see the attached letter from the MD on this matter.

Thank you for your time and attention to this matter. I believe that we have reached a routing alignment which is mutually agreeable.

Yours truly

CARDINAL RIVER COALS LTD.

L. LaFleur
Senior Planning Engineer

cc. B. Hume
F. Munn
A. Maydonik
K. Crane

CHEVIOT PROJECT WATER POLICY
HAMLET OF CADOMIN

The "Cheviot Project" refers to the project proposed by Cardinal River Coals Ltd., located south of Hinton, Alberta, and includes the construction, operation, and decommissioning of a coal processing plant, the development, operation, and reclamation of an open pit coal mine, the restoration of the Mountain Park subdivision rail line, upgrading of the existing access road into the Cheviot Mine area, and the installation of a new transmission line, and substation to supply electrical power to the Cheviot Mine.

OBJECTIVES

CRC will undertake the development, operation, reclamation and abandonment of the Cheviot Project in a manner which will:

1. not affect the quantity or quality of the potable water supply available within the Hamlet of Cadomin; and

2. maintain the flow and water quality of the McLeod River.

WATER POLICY

CRC is aware of and sensitive to Cadomin residents' concerns regarding the quality and quantity of their water supply. While the likelihood of water supply being affected is remote, this water policy has been developed in the event of such an occurrence. The Cheviot Project Water Policy is similar to CRC's 50A Baseline Water Policy which was issued in May, 1991, to cover activities within the A6, A7 and A8 mine areas of the Luscar Mine. Like the 50A Baseline Water Policy, the basis of the Cheviot Water Policy is that CRC will, at its own cost, replace an existing water supply with one of equal quality and performance if that water supply has been lost or damaged as a result of the Cheviot Project. Further, CRC will endeavour to maintain the quality and quantity of water within the McLeod River so as not to adversely affect the Cadomin residents' use and enjoyment of the McLeod River.

CRC will abide by the government environmental standards in effect. During operation of the Cheviot Project, CRC will implement and maintain appropriate protection plans, monitoring procedures and corrective actions to be able to react to water supply problems. Specifically, CRC will:

1. Maintain and regularly monitor observation wells and surface water sampling locations around and in the Cadomin area that are capable of observing water levels and water quality, and provide an advance warning of potential groundwater and surface water impacts. The monitoring program and community reporting procedure will be developed jointly between CRC and CEPA, to include, but not necessarily limited to:

   - drilling of monitoring wells as jointly agreed to by the parties

   - chemical analysis semi-annually of monitoring wells or as agreed to by the parties

   - a well defined monitoring program will be in place at least one year before the start of active mine operations at the proposed pits. The baseline portion of the program will include the collection of groundwater samples from groundwater monitors that are located in the Cadomin area; the collection of a water sample and background comments from domestic wells in Cadomin as well as water samples from the McLeod River. The level of the McLeod River should be monitored and correlated to changes in the groundwater levels noted from monitor network. A method should be adopted to ensure that all groundwater users are informed of the monitoring results on a regular, annual basis. Once mining starts, the permanent groundwater monitoring should include the semi-annual basis or as agreed to by the parties, measurement of water levels in the representative groundwater monitors in Cadomin as well as the semi-annual collection of groundwater samples from this network

   - the monitoring program is subject to review and can be amended upon agreement by both CRC and CEPA

   - a surface water monitoring program should also be developed in conjunction with the groundwater monitoring program. A surface water monitoring program must permit the evaluation of the representative water quality in the McLeod River. Sites should be chosen that are both upstream and downstream of the proposed mine area, each of the discharge points for the settling ponds, the tailings pond and the old mine workings as well as immediately upstream of Cadomin. The surface water monitoring program should include assessments of water quality, benthic invertebrate analysis, river flow and stream bed sediment.

Appendix 2

MOD

Prehearing Meeting 9/23/99

ALBERTA ENERGY AND UTILITIES BOARD
CANADIAN ENVIRONMENTAL ASSESSMENT AGENCY
Calgary Alberta

PREHEARING MEETING
CARDINAL RIVER COALS LTD.

Memorandum of Decision 1999-09-23
Applications No. 960313 and 960314

1 INTRODUCTION

Following a public hearing in 1997, the Federal Department of Fisheries and Oceans (DFO) issued an authorization in respect of the Cheviot Coal Mine Project (the Project). Subsequently, Justice Campbell of the Federal Court Trial Division (the Court) found that the Joint Review Panel (the Panel), which had presided over the hearing, had failed to adequately address a number of issues in its review of the Project and on 8 April 1999 quashed the DFO authorization.

In a letter dated 22 June 1999 the Canadian Environmental Assessment Agency (CEAA) requested that the Panel reconvene in order to complete its work with respect to the issues identified by Justice Campbell. Additionally the EUB, under Section 42 of the Energy Resources Conservation Act, decided to review the applications and the decision made in respect of these applications.

A prehearing meeting, the subject of this report, was held to discuss the issues to be addressed at the reconvened hearing. Also discussed was the availability of information needed by the applicant, Cardinal River Coals Ltd. (CRC), to prepare any further submission, the likely date of any further submission by CRC, and the schedule and process for the review of that submission.

The prehearing meeting was also used to discuss the role of interveners, the establishment of a public registry, and other relevant procedural matters associated with reconvening the hearing.

The prehearing meeting was held in Hinton, Alberta, on 9 September 1999. The attached table lists the meeting participants.

2 SCOPE OF THE HEARING

CRC noted that the Federal Court had considered the issues associated with its application and found only four deficiencies in the environmental assessment. CRC expressed the opinion that, in order to complete the assessment and bring it into compliance with the Canadian Environmental Assessment Act, it was only necessary for the Panel to deal with these four matters. It requested the Panel to stay within the guidelines identified by the Court.

Several interveners expressed the need to expand the scope of the hearing.

The Alpine Club Coalition noted that since the original Panel hearing there had been an escalation of recreational activity in the area and suggested that CRC and the Panel re-examine the cumulative effects related to this increased recreational activity.

The AWA Coalition suggested there was a need to expand the scope of the hearing to include oil and gas development and recreational activities, particularly motorized recreation. It also suggested that a social cost-benefit assessment, including a coal market analysis, should be included.

The Mountain Cree Camp advised the Panel that it had determined that there were additional historical resources in the area of the Project that had not been addressed during the previous hearing.

In considering the scope of the hearing, the Panel agrees with the view expressed by CRC that it must take its primary direction from the four items deemed to be deficient in Justice Campbell's 8 April 1999 decision and from the 22 June 1999 letter from CEAA. In that regard, the Panel finds the issues as set out by Justice Campbell to be clear and therefore is prepared to consider submissions on the following matters:

1) information about likely forestry activity in the vicinity of the Project and the cumulative effects of such activity;

2) information about likely mining in the vicinity of the Project and the cumulative effects of such activity;

3) information regarding a comparative analysis between open pit mining and underground mining at the Project site, including the comparative technical and economical feasibility and comparative environmental effects of each; and

4) two documents previously submitted by the Canadian Nature Federation.

In reaching this conclusion, the Panel does not believe that it is in any way fettered in its ability to address other issues that it finds to be relevant and germane to its review during the course of the public hearing. The Panel notes that cumulative effects include "the sum total of disturbances similar to those related to the proposed activity regardless of their source" and "interactions among dissimilar sources of disturbance" (Draft CEA IL). Oil and gas development, motorized recreation, and other sources of disturbance may need to be considered, along with environmental resources not previously considered, to the extent that they also interact with the Project.

3 INFORMATION NEEDS FOR THE REVIEW

The Panel has advised CRC of the information that the Panel considers necessary to complete its review (see 4 August 1999 letter from Panel chair to CRC's legal counsel). CRC indicated during

the prehearing meeting that work was proceeding and that it would be able to supply the requested information.

The Panel notes that CRC has selected nine valued environmental components (VECs) that it will use for the cumulative effects assessment of forestry and mining activities. In order to ensure that this list is acceptable, the Panel has requested the relevant federal and provincial government departments to comment on the appropriateness and adequacy of the selected VECs. These comments will be forwarded to CRC and other participants in the hearing as soon as possible.

CRC noted some uncertainty regarding the accurate identification of the preliminary disclosures (PDs) for future coal projects in the Project's cumulative effects area and requested that the Panel direct EUB staff to provide comment on the completeness of CRC's list of PDs. The Panel notes that there continues to remain some issues with regards to the confidentiality of these documents. The Panel will review the available options and ensure that this information is placed on the record in a timely fashion.

The Panel notes that several parties have suggested that the Panel retain independent consultants to advise it in the areas of mining, forestry, and cumulative effects. The Panel accepts that it potentially may have a significant role in obtaining sufficient technical information to carry out the additional review prescribed by Justice Campbell. As a result, the Panel will be retaining experts in these areas to review information supplied by CRC and others and advise the Panel as to the acceptability of the information. Once that has been accomplished, the role of the independent experts in the hearing process will be confirmed.

The Panel also intends to further review the need for additional work in areas beyond the scope set out by the Court and will advise participants in the hearing as these decisions are made. To some extent, the Panel anticipates that the extent to which other issues will need to be independently addressed will be a function of the amount and type of information provided by the applicant and by government experts.

The Panel also believes that the use of historical satellite imagery, air photos, and similar tools may be of value in understanding the impact of other sources of development on the regional landscape. The Panel will direct Secretariat staff to investigate this further.

4 LOCATION AND TIMING OF THE HEARING

4.1 Location

CRC, the United Mine Workers of America, and the Town of Hinton took the position that the hearing should continue to be held in Hinton, as Hinton is the community most affected by the Panel's decisions. Several interveners suggested that there was also a need, however, for the hearing to be held in other locations as well, e.g., Edmonton and Jasper. In particular, some argued that the Hinton location would prevent others from participating in the hearing and that the project's impacts affected other communities and environments, such as Jasper National

Park. It was also suggested by the AWA Coalition that the Panel should alter its procedures in some manner, particularly if it were to move the hearing to other locations.

The Panel has carefully considered the various views with respect to location of the hearing as expressed at the prehearing meeting and in correspondence to the Panel. The Panel is of the opinion that the reconvened hearing should continue to be held primarily in Hinton, as was the original hearing. While the Hinton location is clearly not convenient for some members of the public (see below), the Panel does not believe that this concern outweighs the importance of ensuring that the process is open to those most affected.

With regard to ensuring public accessibility, the Panel is prepared to consider holding portions of the hearings on Saturdays or in the evenings if convinced that this is necessary to ensure effective participation by other public members.

While the Panel is of the view that the majority of the hearing should continue to be held in Hinton, the Panel also accepts that other communities (human and ecological) clearly may be affected by its decisions on the Project. In particular, the Panel accepts that Jasper Park, including its human residents, may be affected. Therefore, the Panel is prepared to also carry out a portion of the hearing within the Town of Jasper and the Panel Secretariat will be asked to explore the availability of a suitable site. Those participants that would prefer to submit their evidence in Jasper should advise the Secretariat when making their submissions. The Panel will attempt to meet those requests provided that most of the hearing continues to be held in Hinton.

It should also be noted that while the Panel is prepared to set a portion of the hearing in an alternative location, it does not intend to vary the Rules of Practice established in the earlier portion of the Hearing.

4.2 Timing

CRC submitted a proposed schedule for the submission of information and the resumption of the hearing (prehearing meeting Exhibit 6). That schedule suggested submissions could be filed by all parties no later than mid-November and that the hearing could be scheduled to commence on 10 January 2000.

Other participants, including the federal and provincial government representatives, the ANPC, Trout Unlimited, and the AWA Coalition, spoke against simultaneous filing by all participants.

The federal government stated that its major contribution to the proceedings would be analysis and interpretation of CRC's additional information. It stated it would need four to six weeks to respond to CRC's information. The provincial government also suggested a six-week period for its response to the applicant's information.

Nongovernmental participants sought time to respond to the information provided by CRC and the technical analyses of CRC's information by government departments. An alternative schedule proposed by the AWA Coalition in a letter to then-Minister of Environment Christine Stewart

(prehearing meeting Exhibit 7) and restated at the prehearing meeting also included time to develop and review terms of reference for the hearing. The AWA Coalition provided a flowchart schedule at the prehearing meeting to illustrate its proposal.

In order to be both effective and fair, the Panel believes that the hearing process should proceed expeditiously. The Panel believes that the proposed time line, as set out below, will provide all participants, based on their comments at the prehearing meeting, with adequate time to review new information provided by CRC and other participants.

It is the Panel's view that there is no need to allot time to a review of terms of reference, as proposed by the AWA Coalition. The Panel's views on this matter are outlined in a letter to the applicant dated 4 August 1999 (prehearing meeting Exhibit 2) and reiterated above (see Scope of the Hearing).

The Panel agrees that a period of several weeks is needed to allow participants to respond to the information being brought forward by CRC. The Panel also makes a distinction in this case between government and nongovernment participants. Accordingly, the deadline for submission of written materials by government participants will be, as requested, 30 working days (approximately six weeks) from the receipt of the applicant's final submissions (excluding the last two weeks of December).

The Panel anticipates that the submissions of both the government departments and the Panel's independent consultants will include reviews of CRC's submissions and additional information that might assist the Panel to deal with the issues before it. Therefore any additional information commissioned from independent consultants by the Panel will also be due on the same submission deadline for government departments.

Written submissions from other participants will be due 20 working days (approximately four weeks) later in order to allow time to digest and respond to the added information. This schedule of submission deadlines will provide nongovernment participants ten weeks to review CRC's information and four weeks to review the technical submissions from government departments and independent consultants. All parties, including CRC, are encouraged, however, to submit any information they may have as soon as it becomes finalized in order to maximize the review period.

The Panel believes this schedule will allow all participants a fair opportunity to review the information to be considered at the hearing. The hearing will be scheduled to begin two weeks after the deadline for nongovernment written submissions.

In response to questions from the Panel, CRC indicated that it believed it could provide all of its additional information with the exception of the cumulative effects assessment by mid-October and the remainder by mid-November. Based on the foregoing schedule of submission deadlines, a mid-November filing of CRC's final submissions would result in submission deadlines of approximately10 January and 7 February 2000 respectively for government and nongovernment

participants. The hearing would likely commence on or about 21 February 2000. This schedule of events is illustrated in Figure 1.

It should be understood that this schedule can be achieved only if the information provided by CRC is adequate for the needs of the Panel.

5 PUBLIC REGISTRY

The Panel has established a public registry of materials related to the Project review. The registry is housed at the Hinton Municipal Library, 803 Switzer Drive, and is available to the public Monday through Thursday, 10 a.m. to 8 p.m.; Friday, 10 a.m. to 5 p.m.; and Saturdays and Sunday from noon to 4 p.m.

At the prehearing meeting some participants requested an additional registry in Edmonton. Other participants expressed a concern that if materials were held in two locations, the contents might not be identical.

The Panel believes that providing a second registry in Edmonton will benefit a number of participants in the review and has therefore directed the Panel Secretariat to establish a duplicate registry. To ensure that the contents of the two registries are the same, the Secretariat will prepare a list of contents and undertake a weekly check to verify that new entries are identical. The additional registry will be established at the offices of the Natural Resources Conservation Board, 4th Floor, Pacific Plaza, 9940 - 106th Street, Edmonton. These offices are open from 8:15 a.m. to 4:30 p.m. weekdays by appointment. Users can call (780) 422-1977 to make an appointment to view materials.

6 PARTICIPANT FUNDING

CEAA announced on 12 August 1999 that the federal government will provide up to $30,000 to help the public take part in the reconvened Cheviot Coal Mine joint panel review. CEAA administers the federal Participant Funding Program in accordance with the Canadian Environmental Assessment Act and makes decisions related to the federal funding program independently from the Panel. Accordingly, the Panel is not in a position to amend or alter the level of funding provided by the federal government or the process used in determining the allocation of funds.

At the prehearing meeting, questions were raised by some participants regarding whether additional funding would also be available from the Alberta Energy and Utilities Board (EUB). The Panel notes that it is prepared to accept requests for funding from participants, but until it has had the opportunity to review these, it cannot make any commitments with regard to availability of funds. The Panel notes that any such application should outline the rationale for the request, the purpose of the funding, and any other sources of funding that the party has received. Interveners should also consider, in determining their needs, the Panel's intention to retain independent experts to address the various technical issues.

7 EUB APPROVALS

In August 1997 the EUB issued its approvals with respect to CRC's proposed mine and coal preparation plant. In view of the need to reconvene the joint federal/provincial hearing, the EUB determined that it would also be appropriate to consider the evidence expected to be adduced at

the new hearing and to review its earlier decisions in respect of these approvals under Section 42 of the Energy Resources Conservation Act.
CRC advised that, although it considered that the EUB approvals were still valid, it had no intention of developing the Project until all provincial and federal approvals were in place. CRC noted that while no construction was under way, the conditions of these approvals were being met and that it was in fact in the public interest to maintain these approvals, as they required the submission and reporting of useful information.

The AWA Coalition and the Environmental Resource Centre took the position that the EUB approvals should be rescinded or revoked, in order to ensure the perception of impartiality by the Panel.

The Panel notes that the EUB's legislation does not require approvals arising from a decision being reviewed to be rescinded while the review is under way. However, it clearly would make sense to do so if irreversible effects would otherwise occur during the review process. In this case, however, the Panel notes that CRC has, on one hand, committed to continue to meet the information requirements of the approvals while, on the other, committed ' ' not undertake any interim construction activities. Therefore, the Panel does not believe that it is necessary to rescind the permit to avoid irreversible damage. Nor does the Panel believe that the existence of these approvals in any way fetters its discretion to vary or rescind its previous decisions.

DATED at Calgary, Alberta, on 23 September 1999.

ALBERTA ENERGY AND UTILITIES BOARD
CANADIAN ENVIRONMENTAL ASSESSMENT AGENCY

B. F. Bietz
Panel Chairman

G. J. Miller
Member

Tom Beck
Member

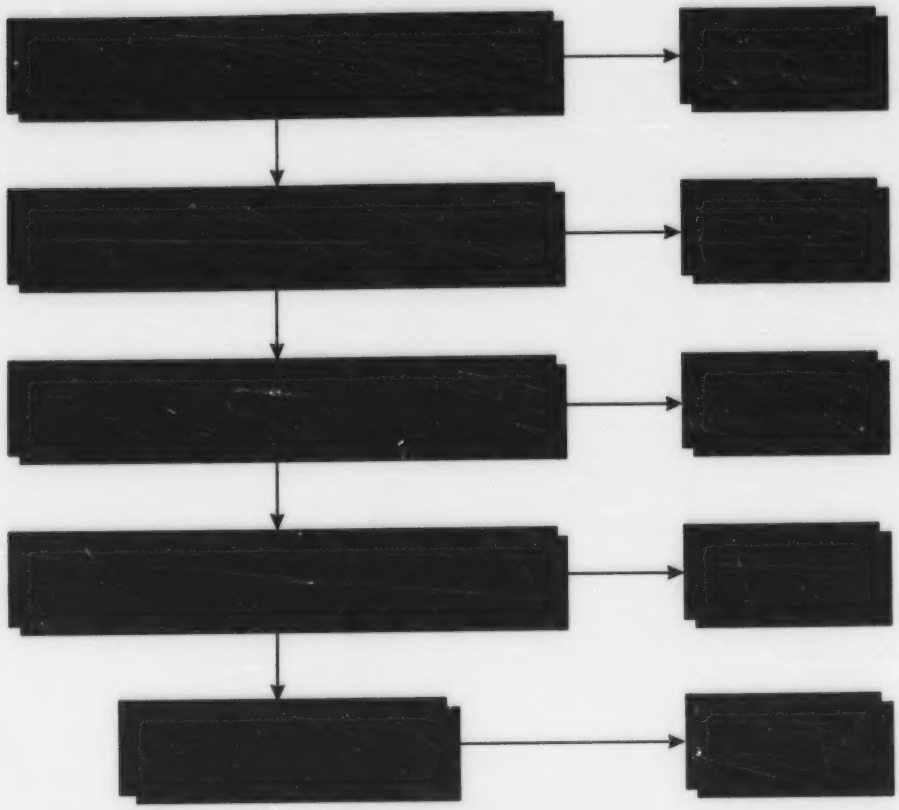


Figure 1.

THOSE WHO APPEARED AT THE HEARING

Principals and Representatives (Abbreviations Used in Report)	Principals and Representatives (Abbreviations Used in Report)
Cardinal River Coals Limited (CRC) D. R. Thomas, Q.C. L. LaFleur	Alberta Wilderness Association, Canadian Parks and Wilderness Association, Jasper Environmental Society, Pembina Institute for Responsible Development, Ben Gadd and the Canadian Nature Federation (the AWA Coalition) D. Pachal S. Gunsch
TransAlta Utilities Corporation Limited (TransAlta) C. J. Meagher	Alberta Fish and Game Association Q. Bochar
Weldwood of Canada (Weldwood) R. Udell	Western Canada Wilderness Committee G. Jones
Hinton & District Chamber of Commerce C. Mork	Mountain Cree Camp B. Parry M. Nadeau
United Mine Workers of American, Local 1656 (UMWA) R. Campbell	J. D. Clark
Ivan Strang, MLA for West Yellowhead	Government of Canada M. King
Alexis First Nation (AFN) K. Buss	Alberta Environment and Alberta Health R. Bodnarek H. L. Veale W. S. Macdonald
	L. Godby
	M. Bracko
Cadomin Environmental Protection Association (CEPA) R. M. Kruhlak	Environmental Resource Centre B. Staszenski
Alpine Club of Canada/Alberta Native Plant Council (Alpine Club Coalition) Dr. A. Dinwoodie	Athabasca Bioregional Society C. Bresnahan

THOSE WHO APPEARED AT THE HEARING (cont'd)

Principals and Representatives (Abbreviations Used in Report)	Principals and Representatives (Abbreviations Used in Report)
Mountain Park Environmental Protection and Heritage Association (Mountain Park Association) M. Salzsauler	Town of Hinton B. Kreiner
Treaty 8 First Nations of Alberta (Treaty 8) J. Cardinal	J. Mitchell
Trout Unlimited K. Brewin	G. Eadie
Rocky Notnes	Panel Secretariat W. Kennedy, Counsel D.I.R. Henderson, P.Eng. J. Baker, P.Biol. R. Powell, P.Biol. J. P. Thompson D. Morris

Appendix 3

Authorization / Approvals

Appendix 3 Approvals and Authorizations Issued by the Province of Alberta and Government of Canada

The following have been reproduced from the best copy available.

The official approvals are the signed ones on file with the source agency. In any cases where the copy included here may be different from the official copy, then the official signed copy is the correct one.

EUB Alberta Energy and Utilities Board

Calgary Office 640 – 5 Avenue SW Calgary, Alberta Canada T2P 3G4 Tel 403 297-8311 Fax 403 297-7336

19 August 1997

Mr. F.J. Munn, P.Eng.
Project Manager, Cheviot Mine
Cardinal River Coals Ltd.
Bag Service 2570
Hinton AB T7V 1V5

FAXED

Dear Mr. Munn:

APPLICATION NO. 960313

The Alberta Energy and Utilities Board (EUB) has granted your application for a permit to develop a surface coal mine site in the Mountain Park area. For this purpose, please find enclosed Permit No. C 97-14.

Kindly note that any operations undertaken pursuant to the authorization of Permit No. C 97-14 are subject to the provisions of the Occupational Health and Safety Act and the Mines Safety Regulation thereunder.

With reference to the various conditions under clause 5 of Permit No. C 97-14, the EUB expects Cardinal River Coals Ltd. to work with the EUB and Alberta Environmental Protection (AEP) to establish firm timelines and expectations to discharge the conditions to the satisfaction of the EUB within six months of this date. The EUB would expect to receive annually, for its review and acceptance, a report which demonstrates how the matters referred to have been addressed. It is suggested that use could be made of the combined AEP/EUB Annual Report for this purpose.

Yours truly,

D.I.R. Henderson, P.Eng.
Staff Engineer
Mine Development Group
Resources Division

DH/

...2

Enclosure

cc: R. Stone/L. Brocke, Alberta Environmental Protection
M. Lascelles, Canadian Environmental Assessment Agency
G. Linsey, Department of Fisheries and Oceans

THE PROVINCE OF ALBERTA

COAL CONSERVATION ACT

ALBERTA ENERGY AND UTILITIES BOARD

IN THE MATTER of a surface coal mine s
Cardinal River Coals Ltd. in the Mountain F
area

PERMIT NO. C 97-14

WHEREAS the Alberta Energy and Utilities Board is prepared to grant an application by Cardin River Coals Ltd. for a permit to develop a surface coal mine site in the Mountain Park area, subje the terms and conditions herein contained, and;

WHEREAS the Lieutenant Governor in Council has given his approval by Order in Council, numbered O.C. 372/97 and dated 13 August, 1997.

THEREFORE, the Alberta Energy and Utilities Board (hereinafter called the EUB), pursuant to t Coal Conservation Act, being chapter C-14 of the Revised Statutes of Alberta, 1980, hereby gran Cardinal River Coals Ltd. (hereinafter called "the Permittee") a PERMIT to develop a surface coa mine site in the Mountain Park area, subject to the provisions of the Act and regulations and orde pursuant thereto and to the following terms and conditions:

1. The mine site shall be known as the Cheviot Mine Site and be designated as Mine No. 18

2. This permit shall apply to 7105 hectares, more or less, in Townships 45 and 46, Ranges 22 and 24, West of the 5th Meridian, as shown in Appendix A1 and A2 hereto attached.

3. Subject to other provisions of this permit, the mining methods, site development and relate operations shall be in accordance with the application of the Permittee to the EUB, registe as Application No. 960313 on 21 March 1996, and in accordance with any subsequent technical modifications thereof which the EUB may approve.

4. The Permittee shall carry out its operations to the satisfaction of the EUB, and in a manner that

   (a) will result in the mining of all practical and economic coal within the permit area,

   (b) will not preclude or render more difficult the recovery of other coal recoverable by practical and reasonable operations, and

(c) will facilitate land reclamation.

5. The Permittee shall

(a) for the purposes of providing a template for the proposed Cheviot mine end pit lal establish an ongoing program into the aquatic ecology of the Luscar Mine's Lac I Roche.

(b) justify the need for each end pit lake and rock drain on an individual basis to the satisfaction of the EUB and Alberta Environmental Protection (hereinafter called AEP).

(c) establish minimum instream flow values in the drainages directly affected by the Cheviot mine and, in consultation with AEP, carry out long-term monitoring of groundwater and surface water quality, including appropriate biomonitoring.

(d) undertake to review available control technologies for metals, nutrients, and other compounds within its settling ponds as well as assess the relevance of current wate quality guidelines to its effluent discharges.

(e) monitor the success of its programs to re-establish native rainbow trout stocks and identify potential alternative areas for habitat enhancement should end pit lakes not prove to be successful.

(f) re-examine its mine plan options in the vicinity of Powerhouse Creek and any other area if appropriate to determine in consultation with the EUB and AEP if disturban of the Englemann spruce-subalpine fir community can be avoided.

(g) in consultation with the EUB, continue to refine its mine plan with the goal of maintaining a 1000 m buffer between areas of mine disturbance and the present boundaries of the Cardinal Divide Natural Area wherever practical. In particular, proposed waste rock dumps which currently intrude within this buffer must be re-examined at the appropriate time and their location justified to the EUB. Should th Cardinal Divide Natural Area be expanded, the Permittee will be required to maxim the distance between mine disturbance and the Cardinal Divide Natural Area to the degree practical, recognizing that the 1000 m buffer likely can no longer be maintained. In consultation with the stewards for the Cardinal Divide Natural Area, the Permittee will also ensure that no access points are created or that its reclamatio programs do not have a negative impact on existing plant communities.

(h) advise the EUB on an annual basis regarding the status of the Carnivore Compensati Program and, within three years of receiving approval for the project and before unmitigable impacts have occurred, shall provide evidence of measurable success in establishing the proposed Carnivore Compensation Program.

(i) monitor the impacts of its increased traffic on wildlife populations along the Grav Flats Road and make any adjustments necessary to reduce wildlife mortality to acceptable levels.

(j) carry out studies needed, in consultation with the EUB, AEP, and Parks Canada, examine current wildlife movement patterns across the mine site and to establish t likely minimum conditions (e.g. width, degree of cover) necessary for wildlife corridors to be effective, and to establish how such corridors might be accommod within the mine plan. Ongoing monitoring to identify new mineral licks is also required.

(k) monitor changes to public access and use patterns resulting from its development : advise AEP if any of these appear to have unduly increased the risk of wildlife hab displacement or of either legal or illegal wildlife mortality.

(l) if it locates a construction camp at Cadomin, educate workers regarding the area sensitivity and monitor the Cadomin Caves trail usage by its workers and contracto

(m) employ all reasonable methods available to reduce impacts on Harlequin duck populations, including reducing disturbance levels in riparian areas of the McLeod River, MacKenzie Creek, and Cardinal River watersheds, and continue to monitor these populations.

(n) prior to commencing any construction work, establish Permissable Noise Levels (a: defined by the EUB's ID 94-4) with respect to residences in the Hamlet of Cadomi and the Whitehorse Creek Recreational Area and, in discussion with EUB staff, determine if noise monitoring at the Cadomin Caves is appropriate.

(o) undertake to pave the west bypass access route provided no significant safety or oth concerns are raised by either the regional authorities or the residents of Cadomin.

(p) review its mine plan in consultation with the EUB, the Mountain Park Association, and Alberta Culture to establish appropriate buffers, access, and signage for the Mountain Park cemetery and former townsite.

(q) establish a *community liaison group* or groups in order to provide interested parties with an opportunity to express concerns, learn about proposed company activities, a receive the results of the Permittee's various monitoring programs. In particular, the Permittee will continue its dialogue to the best of its ability with the Cadomin Environmental Protection Agency, the Mountain Park Association, the stewards of t Cardinal Divide Natural Area, the Alexis First Nation, and the Smallboy Camp.

6. Each mining area and external discard site within the permit area shall be individually license by the EUB prior to the commencement of any mining activity.

7. The Permittee shall advise the EUB of any technical modifications to the development pl and obtain the EUB's approval prior to effecting such modifications.

8. The Permittee shall, as soon as practicable, advise the EUB and provide a preliminary assessment of any incident or accident affecting or having the potential for affecting safet the environment and being attributable to design features or operational methods which a subject to the approval of the EUB.

9. (1) Attached hereto as Appendix B, and made part of this permit, is the order of the Lieutenant Governor in Council authorizing the granting of this permit.

(2) This permit is subject to the terms and conditions, if any, prescribed by the order c Lieutenant Governor in Council set out in Appendix B.

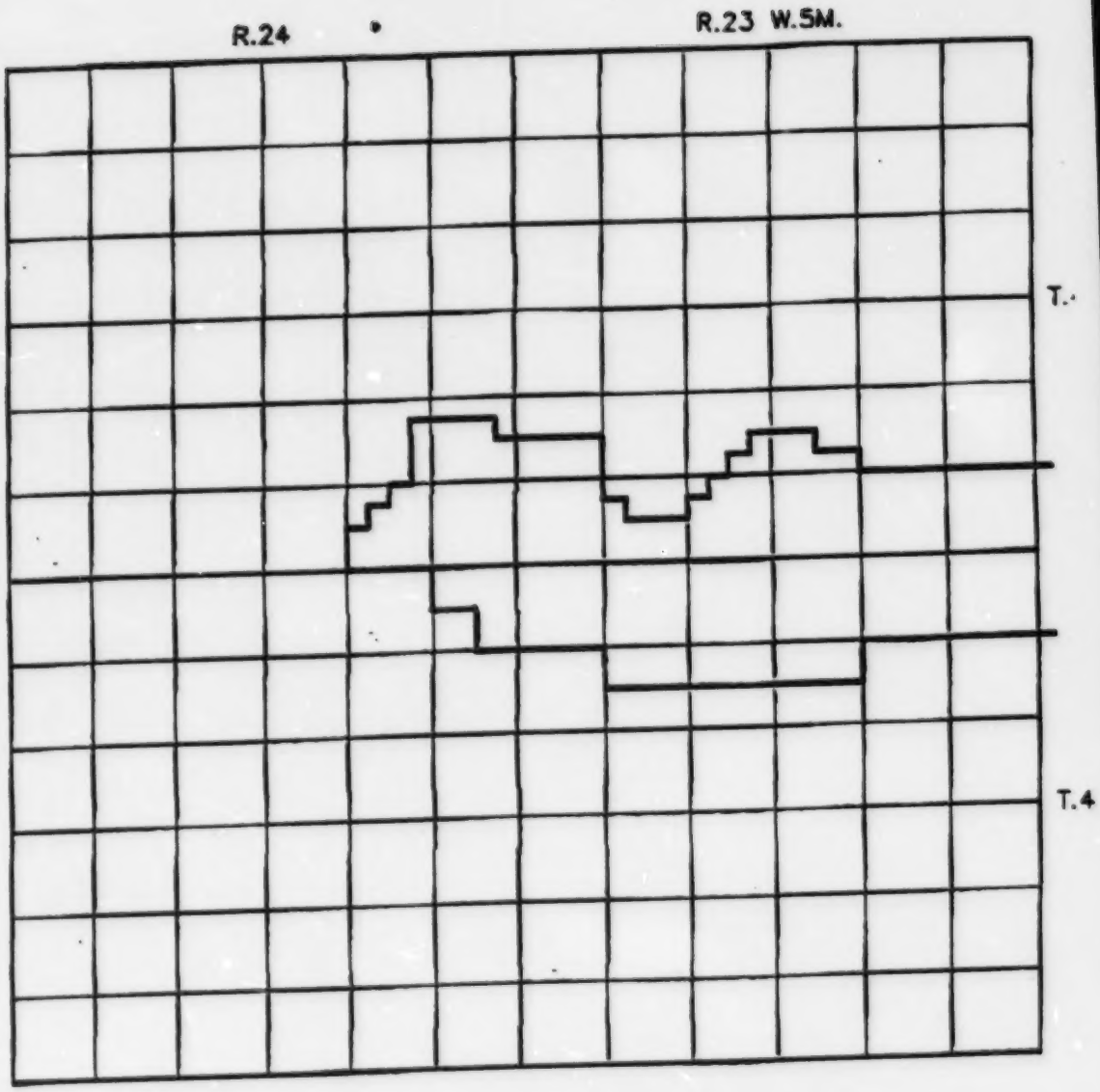
10. The EUB may

(a) cancel or suspend this permit, in whole or in part, for failure of the Permittee to comply with any provision of the Act, the regulations or the terms and conditions s out herein; or

(b) amend this permit or make such other order as it thinks appropriate under the circumstances.

MADE at the City of Calgary, in the Province of Alberta, this 19th day of August, 1997.

ALBERTA ENERGY AND UTILITIES BOA

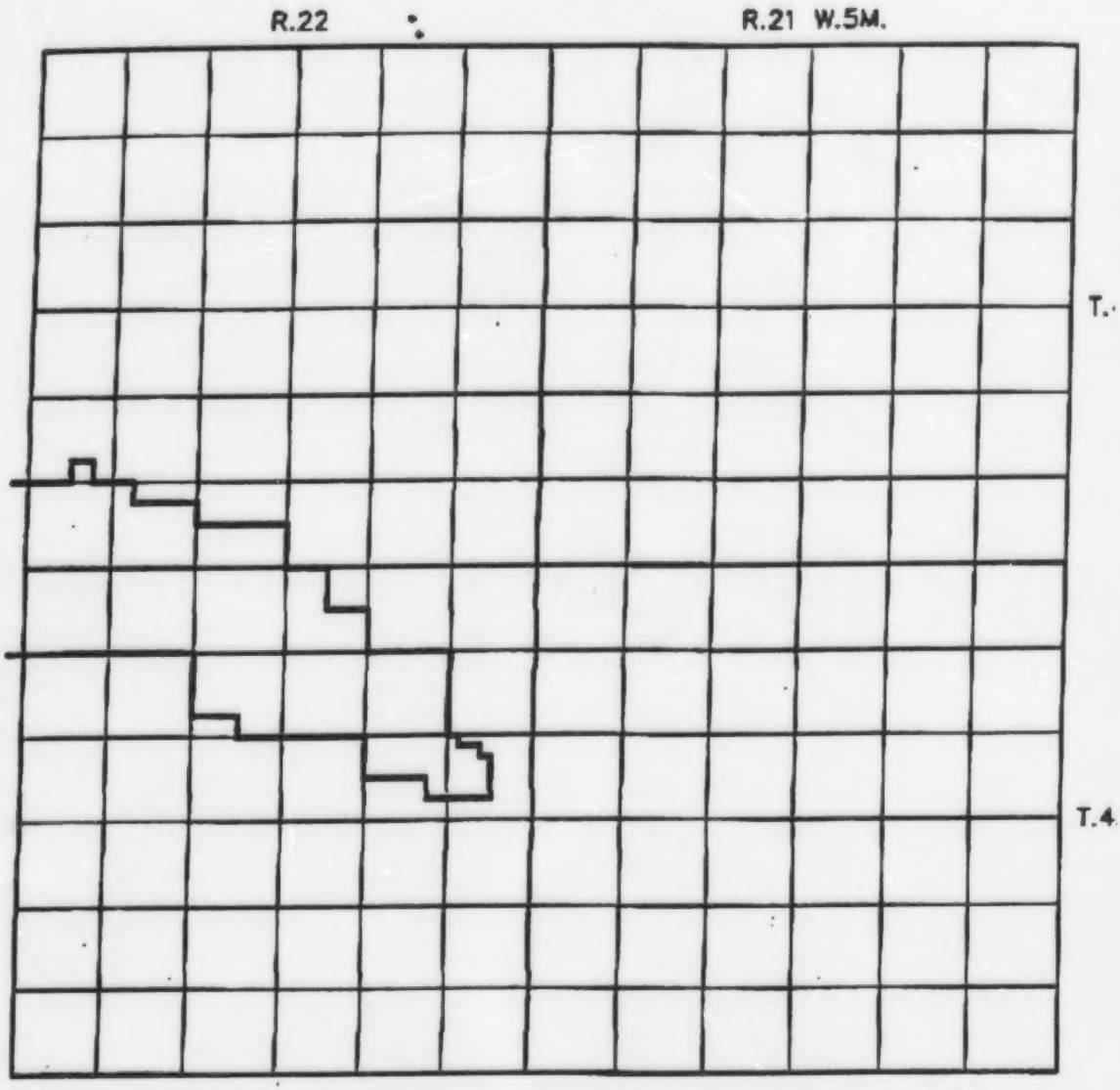


CARDINAL RIVER COALS LTD.–MOUNTAIN PARK AREA

APPENDIX A1 TO PERMIT NO. C 97-14

LEGEND

PERMIT BOUNDARY MINE NO. 1808



CARDINAL RIVER COALS LTD.–MOUNTAIN PARK AREA

APPENDIX A2 TO PERMIT NO. C 97–14

LEGEND

PERMIT BOUNDARY MINE NO. 1808

O.C. 372 /97

APPENDIX B

AUG 1 3 1997

Province of Alberta
Order in Council

ORDER IN COUNCIL

Approved and ordered:

Lieutenant Governor

The Lieutenant Governor in Council authorizes the Alberta Energy and Utilities Board to grant Permit No. C 97-14 to Cardinal River Coals Ltd. in the form attached.

CHAIR

For information only

Recommended by:
Authority:

Minister of Energy
Coal Conservation Act
(section 21)

Alberta

EUB Alberta Energy and Utilities Board

Calgary Office 640 – 5 Avenue SW Calgary, Alberta Canada T2P 3G4 Tel 403 297-8311 Fax 403 297-7336

5 September 1997

Mr. F.J. Munn, P.Eng.
Project Manager, Cheviot Mine
Cardinal River Coals Ltd.
Bag Service 2570
Hinton AB T7V 1V5

FAXED

Dear Mr. Munn:

APPLICATION NO. 960314

The Alberta Energy and Utilities Board has granted your application for an approval to construct and operate a Coal Processing Plant in the Mountain Park area. For this purpose, please find enclosed Approval No. C 97-15.

Kindly note that any operations undertaken pursuant to the authorization of Approval No. C 97-15 are subject to the provisions of the Occupational Health and Safety Act and the Mines Safety Regulation thereunder.

Yours truly,

D.I.R. Henderson, P.Eng.
Staff Engineer
Mine Development Group
Resources Division

DH/

Enclosure

cc: R. Stone/L. Brocke, Alberta Environmental Protection
M. Lascelles, Canadian Environmental Assessment Agency
G. Linsey, Department of Fisheries and Oceans

S:\RSC\MDG\COAL\P&L\DRAFT\C97-15.LTR

THE PROVINCE OF ALBERTA

COAL CONSERVATION ACT

ALBERTA ENERGY AND UTILITIES BOARD

IN THE MATTER of a coal processing plan
Cardinal River Coals Ltd. in the Mountain P
Area

APPROVAL NO. C 97-15

WHEREAS the Alberta Energy and Utilities Board is prepared to grant an application by Cardinal River Coals Ltd. for an approval to construct and operate a coal processing plant in the Mountain Park area, subject to the conditions herein contained; and

WHEREAS the Lieutenant Governor in Council has given his approval by Order in Council, numbered O.C. 402/97 and dated 27 August, 1997.

THEREFORE, the Alberta Energy and Utilities Board (hereinafter called the EUB), pursuant to th Coal Conservation Act, being chapter C-14 of the Revised Statutes of Alberta, 1980, hereby order follows:

1. The construction and operation by Cardinal River Coals Ltd. (hereinafter called "the Operator") of a coal processing plant in the Mountain Park area is approved, subject to the terms and conditions herein contained.

2. The plant shall be designated as Coal Processing Plant No. 10 and shall be located in Township 46, Range 23, West of the 5th Meridian.

3. Subject to other provisions of this approval, the plant shall be constructed and operated in accordance with the application to the EUB registered as Application No. 960314 on 21 March 1996 and in accordance with any technical modification thereof which the EUB may approve.

4. The Operator shall, prior to construction, submit for the approval of the EUB the final desig of the processing plant.

5. The Operator shall, as soon as practicable, advise the EUB and provide a preliminary assessment of any incident or accident affecting or having the potential for affecting safety o the environment and being attributable to design features or operational methods which are subject to the approval of the EUB.

6. The Operator shall operate the plant to the satisfaction of the EUB and in a manner that results in the recovery of the practical and economic maximum of the marketable coal fro raw coal mined and processed.

7. Any discard material shall be disposed of in a manner satisfactory to the EUB to reduce th potential for spontaneous combustion and to prevent it from becoming a hazard to worke public safety or contributing to air or water pollution.

8. The Operator shall advise the EUB of any significant modifications

   (a) to the plant, or

   (b) in the method or facilities employed for the storage or loading of clean coal, or

   (c) in the method or facilities employed for the storage or disposal of discard material from the plant,

   and obtain its approval prior to effecting such modifications.

9. (1) Attached hereto as Appendix A, and made part of this approval, is the order of the Lieutenant Governor in Council authorizing the granting of this approval.

   (2) This approval is subject to the terms and conditions, if any, prescribed by the Lieutenant Governor in Council as set out in Appendix A.

10. The EUB may

   (a) rescind or suspend this approval, in whole or in part, or shut down the plant, for failure of the Operator to comply with any provision of the Act, the regulations or terms and conditions set out herein; or

   (b) amend this approval, or make such other order as it deems suitable under the circumstances.

MADE at the City of Calgary, in the Province of Alberta, this Fifth day of September, 1997.

ALBERTA ENERGY AND UTILITIES BOA

O.C. 402 /97

AUG 27 1997

APPENDIX A

Province of Alberta
Order in Council

ORDER IN COUNCIL

Approved and ordered:

Lieutenant Governor

The Lieutenant Governor in Council

1 authorizes the Alberta Energy and Utilities Board to issue Appro No. C 97-15 to Cardinal River Coals Ltd. in the form attached, and

2 rescinds Order in Council numbered O.C. 373/97.

ACTING CHAIR

Alberta

For information only

Recommended by: Minister of Energy

Authority: Coal Conservation Act

R9L
a

Government of Canada / Gouvernement du Canada

Fisheries and Oceans / Pêches et Océans

CONFIRMATION COPY

August 17, 1998

Mr. F.J. Munn
Project Manager
Cardinal River Coals Limited
Bag Service 2570
Hinton, Alberta T7V 1V5

Your file / Votre référence

Our file / Notre référence

Dear Mr. Munn:

Re: Authorization for the harmful alteration, disruption or destruction of fish habitat pursuant to Subsection 35(2) of the *Fisheries Act*

The harmful alteration, disruption or destruction of fish habitat arising from the upgrading of Grave Flats Municipal Road and restoration of the Mountain Park Subdivision rail line from Cadomin, collectively referred to as the Cheviot Mine access corridor, is hereby authorized pursuant to Subsection 35(2) of the *Fisheries Act*. This Authorization shall be conditional upon implementation of the mitigation and compensation measures specified on the attached document. Failure to comply with any of the conditions in this Authorization may result in contravention of Section 35 of the *Fisheries Act*.

The environmental impacts of this undertaking have been reviewed by a joint federal / provincial review panel in accordance with the *Canadian Environmental Assessment Act*. The conclusions of the Joint Review Panel are presented in the report entitled "Report of the EUB-CEAA Joint Review Panel, Cheviot Coal Project, Mountain Park, Alberta", issued in June, 1997.

Please be advised that this Authorization does not imply authorization of this undertaking in accordance with any section of the *Fisheries Act* other than Section 35, nor does it supersede the requirements of any other federal, provincial or municipal legislation. Further, this Authorization applies only to the above-referenced project components. Any future authorizations pursuant to the *Fisheries Act* will be assessed on an individual basis.

Please do not hesitate to call Mr. Garry Linsey at (204) 984-2502 should you have any questions or require additional information.

Yours sincerely,

J.N. Stein, Manager
Habitat Management Division
Central and Arctic Region

Attach.

cc: G. Linsey (DFO, Winnipeg)
D. Robinson (DFO, Ottawa)
T. Swerdfager (DOE, Edmonton)
R. Christie (CEAA, Edmonton)
R. Pierce (DFO, Sarnia)
J. Cooley (DFO, Burlington)
M. Barrett (AEP, Edmonton)
D. Hodgins (Parks, Jasper)
S. Faulkner (DOJ, Edmonton)

Fisheries and Oceans
Pêches et Océans

Authorization issued to: / Autorisation délivrée à : Cardinal River Coals Limited

Name: / Nom: F.J. Munn
Project Manager

Address: / Adresse: Bag Service 2570
Hinton, Alberta
T7V 1V5

Telephone No.: / No de Téléphone: (403) 692-5100

Location of Project/Emplacement du projet

The project is located in the Municipal District of Yellowhead (No. 94) approximately 12 km south of the Hamlet of Cadomin, Alberta. The corridor consists of upgrading the Grave Flats municipal road, south from Highway 40 at Cadomin, along the McLeod River valley, and the restoration of the existing Mountain Park Subdivision rail line from Cadomin.

Valid Authorization Period/Période de validité

From/De August 17, 1998 To/À December 31, 2003

Description of Works or Undertakings (Type of work, schedule, etc.)
Description des ouvrages ou entreprises (Genre de travail, calendrier, etc.)

1) Upgrading of Grave Flats Road

Culverts - Upper and Lower Layland Creek
- Cadomin Springs
- Prospect Creek (multi-plate)
- Cheviot Creek
- McLeod River (multi-plate)

Riprap Installation - McLeod River, north of Cadomin

Ford Crossing of Whitehorse Creek

Diversion of Thornton Creek

2) Restoration of the Mountain Park Subdivision Rail Line

Channel Restoration - McLeod River
Channel Realignment - McLeod River
Multi-plate Culverts - Prospect Creek
- McLeod River (rail only)
- McLeod River (rail and haul road)
Culverts - Cheviot Creek
Riprap Installation - Numerous locations
Retaining wall structures - Three along the McLeod River

Conditions of Authorization/Conditions de l'autorisation

SH AND FISH HABITAT

Fisheries and Oceans
Pêches et Océans

1.1 Culverts shall be installed and maintained in a manner such that they allow the free passage of fish. This shall apply to in fish bearing waters as well as to culverts in watercourses that have the potential to support fish in the upper McLeod system as described in "The Cheviot Mine Project Access Corridor Licence Application" (October, 1997).

1.2 The culverts described in 1.1 shall be monitored on a routine basis, for the life of the crossing, to ensure that they conti allow the free passage of fish. If any of the culverts are found to be deficient in this respect, repairs, maintenance or replacement shall be undertaken as soon as possible.

1.3 At each installation site involving the use of multiple culverts, one of the culverts shall be installed at a lower elevation t others so as to ensure adequate flows for the passage of fish during low flow periods.

1.4 The culvert crossings described in 1.1 and constructed for the Grave Flats Road shall be monitored for the life of the pr determine whether ice build up, during spring, blocks fish passage through these culverts. Should this be the case, follo decommissioning of the mine and the rail line, CRC shall have in place plans to ensure that required inspection and maintenance, which includes ice removal, continues or that the culvert crossings for the Grave Flats Road are replaced suitable bridge structures.

1.5 For watercourse crossings other than those referenced in 1.4 (above), following decommissioning of the mine and the r culverts and multi-plate installations shall be removed and the beds and banks of the watercourses stabilized and reclai

1.6 Temporary erosion control measures shall be employed during culvert installations and following construction until such permanent erosion control is established.

1.7 Cardinal River Coals Limited (CRC) shall make every effort to restrict instream work to the period from July 16 to Augus any year in fish bearing watercourses and in water courses that flow into fish bearing waters and shall employ constructi mitigation methods which minimize the amounts of suspended sediment introduced into these watercourses. For the rem periods of any year, isolation techniques, as described in "The Cheviot Mine Project Access Corridor Licence Applicatio (October, 1997), shall be employed in undertaking any construction activities within or immediately adjacent to the wette perimeter of these watercourses.

1.8 During construction activities within or adjacent to the wetted perimeter of fish bearing watercourses and watercourses th into fish bearing waters, suspended sediment concentrations shall be monitored immediately downstream of the constru site. For the period of September 1st to July 15th, construction activities shall be temporarily terminated if suspended se concentrations exceed levels recommended for the protection of aquatic life, in the "Canadian Water Quality Guidelines". to resuming construction, additional mitigation measures shall be implemented to reduce the levels of suspended sedime introduced into the watercourse.

2. Riprap Bank Armouring (Road and Rail Line) and Ford Crossing (Whitehorse Creek)

2.1 Material used for bank armouring shall be clean and free of fines and shall be sized to withstand erosion at design flood s or greater.

2.2 Material used for construction of the ford crossing shall be clean and free of fines.

2.3 Riprap bank armouring shall be installed as described on pages 11, 12 and 17 of section 3 and in drawings 110-STD-5 a 120-STD-5 of Appendix 4 in "The Cheviot Mine Project Access Corridor Licence Application" (October, 1997).

2.4 CRC shall make every effort to restrict instream work to the period from July 16 to August 31 of any year in fish bearing watercourses and in watercourses that flow into fish bearing waters and shall employ construction and mitigation method which minimize the amounts of suspended sediment introduced into these watercourses. For the remaining periods of an year, isolation techniques, as described in "The Cheviot Mine Project Access Corridor Licence Application" (October, 199 shall be employed in undertaking any construction activities within or immediately adjacent to the wetted perimeter of thes watercourses.

2.5 During construction activities within or adjacent to the wetted perimeter of fish bearing watercourses and watercourses th into fish bearing waters, suspended sediment concentrations shall be monitored immediately downstream of the construct site. For the period of September 1st to July 15th, construction activities shall be temporarily terminated if suspended sed concentrations exceed levels recommended for the protection of aquatic life, in the "Canadian Water Quality Guidelines".. to resuming construction, additional mitigation measures shall be implemented to reduce the levels of suspended sedimer

2.3 All equipment using the ford crossing shall be free of excessive grease, mud and other contaminants that could potentia the watercourse.

2.7 Use of the ford crossing shall be kept to a minimum and restricted to equipment that exceeds the capacity of the bridge structure.

3. Retaining Wall Structures - McLeod River (Rail Line))

3.1 Retaining walls shall be constructed as described in drawings 120-RET-10 (Sheets 1, 2 and 3), 120-RET-11 and 110-ST Appendix 5 in "The Cheviot Mine Project Access Corridor Licence Application" (October, 1997).

3.2 CRC shall make every effort to restrict instream work to the period from July 16 to August 31 of any year in fish bearing watercourses and in watercourses that flow into fish bearing waters and shall employ construction and mitigation method which minimize the amounts of suspended sediment introduced into these watercourses. For the remaining periods of ar year, isolation techniques, as described in "The Cheviot Mine Project Access Corridor Licence Application" (October, 19 shall be employed in undertaking any construction activities within or immediately adjacent to the wetted perimeter of thes watercourses.

3.3 During construction activities within or adjacent to the wetted perimeter of fish bearing watercourses and watercourses thi into fish bearing waters, suspended sediment concentrations shall be monitored immediately downstream of the construct site. For the period of September 1st to July 15th, construction activities shall be temporarily terminated if suspended sed concentrations exceed levels recommended for the protection of aquatic life, in the "Canadian Water Quality Guidelines".. to resuming construction, additional mitigation measures shall be implemented to reduce the levels of suspended sedimer introduced into the watercourse.

4. Channel Restoration - McLeod River (Rail Line) - km 44.8

4.1 Work shall be undertaken as described in section 4.1.8 (page 24) and drawings 120-CGD-4, 120-CGD-5 and 120-CGD-6 Appendix 10 in "The Cheviot Mine Project Access Corridor Licence Application" (October, 1997).

4.2 Should existing plans be modified to accommodate fisheries enhancement work, as per condition 7.1 of this Authorization, design plans for this channel restoration shall be submitted to the Department of Fisheries and Oceans (DFO) and Alberta Environmental Protection (AEP) for approval prior to commencement of work.

4.3 Should fish habitat enhancement structures be constructed in the proposed new channel, as per condition 7.1 of this Authorization, they shall be constructed during the period when the initial channel restorstion work is being undertaken and water is being diverted to the new channel.

4.4 CRC shall make every effort to restrict instream work to the period from July 16 to August 31 of any year in fish bearing watercourses and in watercourses that flow into fish bearing waters and shall employ construction and mitigation methods which minimize the amounts of suspended sediment introduced into these watercourses. For the remaining periods of any year, isolation techniques, as described in "The Cheviot Mine Project Access Corridor Licence Application" (October, 1997, shall be employed in undertaking any construction activities within or immediately adjacent to the wetted perimeter of these watercourses.

4.5 During construction activities within or adjacent to the wetted perimeter of fish bearing watercourses and watercourses that into fish bearing waters, suspended sediment concentrations shall be monitored immediately downstream of the constructio site. For the period of September 1st to July 15th, construction activities shall be temporarily terminated if suspended sedin concentrations exceed levels recommended for the protection of aquatic life, in the "Canadian Water Quality Guidelines".. P to resuming construction, additional mitigation measures shall be implemented to reduce the levels of suspended sediments introduced into the watercourse.

4.6 Should fish habitat enhancement structures be constructed in the proposed new channel, as per condition 7.1 of this Authorization, "as constructed" drawings certified by a licenced professional engineer shall be submitted to DFO within three months of completion of construction.

5.1 Work shall be undertaken as described in section 4.1.8 (page 24) and drawings 110-RP-20 and 110-GA-1 of Appendix "The Cheviot Mine Project Access Corridor Licence Application" (October, 1997).

5.2 Should existing plans be modified to accommodate fisheries enhancement work, as per condition 7.1 of this Authorizat design plans for this channel realignment shall be submitted to DFO and AEP for approval prior to commencement of

5.3 Should fish habitat enhancement structures be constructed in the proposed new channel, as per condition 7.1 of this Authorization, they shall be constructed during the period when the initial channel restoration work is being undertaken water is being diverted to the new channel.

5.4 CRC shall make every effort to restrict instream work to the period from July 16 to August 31 of any year in fish bearin watercourses and in watercourses that flow into fish bearing waters and shall employ construction and mitigation metho which minimize the amounts of suspended sediment introduced into these watercourses. For the remaining periods of year, isolation techniques, as described in "The Cheviot Mine Project Access Corridor Licence Application" (October, 1 shall be employed in undertaking any construction activities within or immediately adjacent to the wetted perimeter of th watercourses.

5.5 During construction activities within or adjacent to the wetted perimeter of fish bearing watercourses and watercourses t into fish bearing waters, suspended sediment concentrations shall be monitored immediately downstream of the constru site. For the period of September 1st to July 15th, construction activities shall be temporarily terminated if suspended s concentrations exceed levels recommended for the protection of aquatic life, in the "Canadian Water Quality Guidelines" to resuming construction, additional mitigation measures shall be implemented to reduce the levels of suspended sedim introduced into the watercourse.

5.6 Should fish habitat enhancement structures be constructed in the proposed new channel, as per condition 7.1 of this Authorization, "as constructed" drawings certified by a licenced professional engineer shall be submitted to DFO within t months of completion of construction.

Channel Diversion - Thornton Creek - near road station 15+700

6.1 Work shall be undertaken as described in section 4.1.13 (page 32) and drawing 140-1PP-15 of Appendix 17 in "The Che Mine Project Access Corridor Licence Application" (October, 1997).

6.2 Should existing plans be modified to accommodate fisheries enhancement work, as per condition 7.1 of this Authorizatio design plans for this diversion channel shall be submitted to DFO and AEP for approval prior to commencement of work.

6.3 CRC shall make every effort to restrict instream work to the period from July 16 to August 31 of any year in fish bearing watercourses and in watercourses that flow into fish bearing waters and shall employ construction and mitigation method which minimize the amounts of suspended sediment introduced into these watercourses. For the remaining periods of a year, isolation techniques, as described in "The Cheviot Mine Project Access Corridor Licence Application" (October, 19 shall be employed in undertaking any construction activities within or immediately adjacent to the wetted perimeter of the watercourses.

6.4 During construction activities within or adjacent to the wetted perimeter of fish bearing watercourses and watercourses th into fish bearing waters, suspended sediment concentrations shall be monitored immediately downstream of the construc site. For the period of September 1st to July 15th, construction activities shall be temporarily terminated if suspended sed concentrations exceed levels recommended for the protection of aquatic life, in the "Canadian Water Quality Guidelines".. to resuming construction, additional mitigation measures shall be implemented to reduce the levels of suspended sedime introduced into the watercourse.

7. Fish Habitat Compensation for Works Associated with the Access Corridor

During the open water period in 1998, CRC shall undertake a survey of the upper McLeod River and its tributaries to ident potential sites for fish habitat enhancement as would increase the likelihood of survival success of rainbow trout in the up McLeod River system upstream of the falls near the confluence with Whitehorse Creek. The feasibility of constructing and maintaining enhancement structures at these potential sites shall be evaluated by a qualified engineer and a report submi DFO and AEP by December 31, 1998. Following review of this report, CRC shall implement a fish habitat enhancement program as deemed appropriate by DFO and AEP. Potential fish habitat enhancement structures identified as feasible in t reaches of the McLeod River where channel restoration or realignment work has been proposed, shall be constructed duri

7.2 CRC is responsible for ensuring that the habitat enhancement structures created pursuant to point 7.1 (above) are prop functioning for the period of railway operation and reclamation. If monitoring indicates that these structures are not fun as designed, CRC shall carry out or cause to be carried out at its own cost and expense, with due diligence and in a go workmanlike manner, and to the satisfaction of DFO, any reasonable modifications deemed by DFO to be necessary to the enhancement structures to function as designed.

8. Monitoring Programs

In addition to monitoring programs described in previous sections of this Authorization:

8.1 CRC shall design and implement, to the satisfaction of DFO and AEP, a suspended sediment monitoring program for the McLeod River and its tributaries during and following construction activities. This monitoring shall be undertaken for the the project and for a period of time following site reclamation as necessary to evaluate the effectiveness of the erosion c measures. Should this monitoring indicate that suspended sediment exceeds acceptable levels, additional mitigation mea shall be implemented by CRC to reduce the levels of suspended sediments introduced into the watercourses. Results of monitoring program shall be documented and reports provided to DFO on an annual basis.

8.2 CRC shall design and implement, to the satisfaction of DFO and AEP, a program to monitor the potential impacts of the proposed project on fish and fish habitat in the upper McLeod River, downstream of the falls near the Whitehorse Creek confluence.

8.3 CRC shall design and implement, to the satisfaction of DFO and AEP, a program to monitor the quality of water in the Mc River downstream of the project site. Initially, this monitoring program will provide baseline water quality data and followin commencement of project development, will demonstrate project impacts on water quality as well as compliance with the appropriate water quality guidelines.

MIGRATORY BIRDS

9.1 CRC shall minimize vegetation clearing from May 1 to July 31 in order to reduce the impact on breeding migratory bird populations. When proposing to clear vegetation within this period, CRC shall obtain authorization in writing from an AEP Conservation and Reclamation Inspector and consult with Environment Canada (DOE).

9.2 Construction activities within 70 meters of the McLeod River and its tributaries shall not be undertaken between May 1 and August 31 except in accordance with the recommendations and schedule described in the Harlequin Duck Mitigation Plan included as appendix 20 of "The Cheviot Mine Project Access Corridor License Application" (October 1997). In addition, t Red lining windows for Zones B, C, and D shall be expanded to extend from July 10 to August 31.

9.3 CRC shall design and implement, to the satisfaction of DOE and AEP, a program to monitor the potential impacts of the proposed project on harlequin ducks in the McLeod River / Whitehorse Creek watershed. This monitoring shall include su parameters as numbers of birds, habitat use and productivity. If monitoring indicates that mitigative actions are not functio as designed, CRC shall carry out or cause to be carried out at its own cost and expense, with due diligence, any reasonab modifications deemed necessary by, and to the satisfaction of, DOE and AEP. Progress reports shall be submitted to DOE annually.

9.4 CRC shall not undertake any construction activities within 70 meters of active Harlequin Duck nests. Active nest locations be communicated to DOE and AEP upon discovery. Any exceptions shall be made in consultation with DOE and AEP.

The holder of this authorization is hereby authorized under the authority of section 35(2) of the Fisheries Act, R.S.C., 1985, c. F. 14, to carry out the work or undertaking described herein.

Le détenteur de la présente est autorisé en vertu du paragraphe 35(2) de la Loi sur les pêches, L.R.C. 1985, c 14, à exploiter les ouvrages ou entreprises décrits aux présentes.

his authorization is valid only with respect to fish habitat and of no other purposes. It does not purport to release the

L'autorisation n'est valide qu'en ce qui concerne l'habitat

Fisheries and Oceans
Pêches et Océans

ailure to comply with any condition of this authorization may result in charges being laid under the Fisheries Act.

This authorization form should be held on site and work crews should be made familiar with the conditions attached.

En vertu de la Loi sur les pêches, des accusations po être portées contre ceux qui ne respectent pas les co prévues dans la présente autorisation.

Cette autorisation doit être conservée sur les lieux de travaux, et les équipes de travail devraient en connaît conditions.

Date of issuance AUGUST 17/98

Approved by

Title MANAGER, HABITAT MANAGEMENT

Date de délivrance

Approuvé par

Titre

17 August 1998

File: 60275

Mr. Fred Munn
Cardinal River Coals Ltd.
Bag Service 2570
Hinton, Alberta
T7V 1V5

Dear Mr. Munn:

RE: CHEVIOT MINE ROAD AND RAIL ACCESS CORRIDOR PERMIT

Enclosed are Permit Nos. 98-44-NES and 98-45-NES, which authorize in accordance with the *Water Resources Act* the construction of structures associated with the Grave Flats Road Upgrading and the Rail Restoration Projects.

Please note that:

1. These authorizations do not supersede approvals required pursuant to other provincial acts.

2. These approvals should not be taken to mean that you have an authority under federal legislation. You should contact **Habitat Management, Central and Arctic Region, Fisheries and Oceans, 501 University Crescent, Winnipeg, R3T 2N6 (phone: 204-985-2505)** in relation to the application of federal laws relating to the *Fisheries Act (Canada)* and the **Navigation Protection Program, Canadian Coast Guard, 201 North Front Street, Suite 703, Sarnia, Ontario, N7T 8B1 (phone: 519-383-1862)** relating to the *Navigable Waters Protection Act*.

3. In order to reduce the potential of the spread of **whirling disease** in fish, we ask that all equipment and machinery that has been used in the United States be washed clean of all mud and dirt before being used again in any activities in or near streams in Alberta.

4. Further to your "Response to Additional Information Requirements Access Corridor Application", December 1997, it is our understanding that the proposed McLeod River road culvert crossing (Sta. 15+762.5) will be removed in a 5 to 10 year period after commencement of the mine operations. Should there be any change to this plan, Cardinal River Coals Ltd. shall contact the Department to determine the actions to take.

.../2

5. In any condition where information is to be requested by or submitted to the Controller of Water Resources, the information will be requested by or provided to the Manager, Regional Support, Northern East Slopes Region.

If you have further questions or comments regarding the permits, please contact José Michel at (403) 427-6451.

Sincerely,

Patrick Marriott, P.Eng.
Manager, Regional Support
Northeast Boreal Region

JRM/

Enclosures

cc: Garry Linsey, Department of Fisheries and Oceans
Dennis Bratton, C & R Review Committee
Jim Skrenek, NRS-Northern East Slopes
Dave Henderson, EUB
Al Lang, P.Eng., Manager, Regional Support, NES

Cardinal River Coals Ltd. Bag Service 2570 Hinton, Alberta T7V 1V5 (referred to below as "Cardinal")	**FILE No.**	60275
	DATE ISSUED	August 17, 1998
	PERMIT No.	98-44-NES

is authorized under the WATER RESOURCES ACT, to carry out works associated with the upgrading of the Grave Flats Road to access the Cheviot Mine. The road will be located in Section 33, Township 45; Sections 4, 5, 7, 8, 18, 19, 30 and 31, Township 46; Sections 5, 8, and 17, Township 47, Range 23; and Section 24, Township 46, Range 24, West of the 5th Meridian. Included in the works are: construction of road bridges, installation of culverts, realignment and/or armouring of associated sections of the McLeod River and local streams, and installation of a heavy equipment fording site on Whitehorse Creek. All work is to be carried out according to the October 10, 1997 and the August 12, 1998 reports filed and identified in departmental records as:

W.R. REPORT NO.	**TITLE**
60275-R1	Access Corridor Licence Application
60275-R2	Access Corridor Applications (Road and Rail) File No. 60275 - Supplemental Information

This permit is subject to the following conditions:

1. Cardinal is responsible for the construction, operation and maintenance of the works and for any damage that may result therefrom. Cardinal must, upon finalizing an agreement with the Municipal District of Yellowhead No. 94, submit to this office a letter detailing the responsibilities of the parties related to construction, takeover and maintenance of the works.

2. Subject to condition 3, no in-stream activity is permitted in the waters of the McLeod River and tributaries between September 1 and July 15 of the following year in order to protect spawning and incubation of fish.

3. In-stream work between September 1 and July 15 of the following year will be accommodated provided that:

   (a) isolation techniques are used;
   (b) the Canadian Water Quality Guidelines for suspended solids are met; specifically, that suspended solids derived from construction activities shall not exceed 10 mg/L when background levels are ≤ 100 mg/L, or 10% of background levels when background levels are > 100 mg/L;
   (c) monitoring of suspended solids occurs above and below the construction site during and immediately following any in-stream activity;
   (d) construction activities are temporarily suspended if the levels in condition 3(b) are exceeded. Prior to resuming construction, additional mitigation measures shall be implemented to reduce the levels of suspended sediments introduced into the

4. The deposition of deleterious material in the McLeod River and tributaries is prohibited.

5. Cardinal shall maintain stream flow downstream from individual construction sites at all times. The water handling and drainage plans proposed by the construction contractors for any of the watercourse crossings shall be reviewed and approved by an officer of the Land and Forest Service and/or the Natural Resources Service prior to implementation.

6. Where portions of the road right-of-way slopes to the watercourse, Cardinal shall install adequate controls to prevent erosion and siltation.

7. Cardinal shall utilize only one ford-crossing site for heavy equipment at Whitehorse Creek. The fording site must be identified, inspected and approved by an officer of the Natural Resources Service prior to its construction and use.

8. Prior to any creek fording, Cardinal shall obtain the approval of an officer of the Natural Resources Service, and shall ensure that excessive grease, mud and other contaminants that may fall into or that may be in contact with the creek water are removed from the equipment.

9. Culverts must be designed, installed, and maintained to allow upstream passage of fish on fish bearing streams and streams with potential to support fish. Cardinal shall install the culverts that will allow upstream passage of fish at the same general slope as the existing stream channel bed.

10. Disturbance of the bed and banks of the McLeod River and tributaries arising from any activity or equipment used in the project is to be kept to a minimum and confined to the immediate work site.

11. With the exception of the Thornton Creek diversion described in the Application, the bed and banks of the McLeod River and tributaries shall be restored to their original contours, concurrently with project completion.

12. Cardinal shall carry out debris disposal, cleanup, and reclamation concurrently with the operations.

13. All disturbed areas are to be stabilized and reclaimed within one growing season; interim measures must be implemented to prevent short-term erosion problems.

14. Cardinal shall implement a Harlequin Duck mitigation plan, including the retention of a Biologist on site, for the construction period, and shall continue its Harlequin ducks monitoring program for the duration of the Cheviot Mine Project. Ongoing reports shall be submitted to the Controller each year during the life of the project. Cardinal and the Department shall perform an overall evaluation at the end of the project to determine the impact of the Prospect Creek culvert, and to consider the need for alternative plans at abandonment.

15. Cardinal shall submit to the Controller an as-constructed report, complete with plans of the works, upon completion of the road upgrading.

17. This authority to upgrade the road and construct its related structures expires on December 31, 2001

Department of Environmental Protection

_____

Manager, Regional Support
Northeast Boreal Region

Cardinal River Coals Ltd.
Bag Service 2570
Hinton, Alberta
T7V 1V5
(referred to below as "Cardinal")

FILE No. 60275

DATE ISSUED August 17, 1998

PERMIT No. 98-45-NES

is authorized under the WATER RESOURCES ACT, to carry out works associated with the restoration of the Cheviot Mine rail access located in Sections 4, 5, 7, 8, 18, 19 and 30, Township 46, Range 23, West of the 5th Meridian. Included in the works are: the construction of a railway bridge, installation of culverts, realignment and armouring of associated sections of the McLeod River and local streams, and the demolition and removal of existing bridge structures. All work is to be carried out according to the October 10, 1997 and the August 12, 1998 reports filed and identified in departmental records as:

W.R. REPORT NO.	TITLE
60275-R1	Access Corridor Licence Application
60275-R2	Access Corridor Applications (Road and Rail) File No. 60275 - Supplemental Information

This permit is subject to the following conditions:

1. Cardinal is responsible for the construction, operation and maintenance of the works and for any damage that may result therefrom. Cardinal must, upon finalizing an agreement with Canadian National Railways, submit to this office a letter detailing the responsibilities of the parties related to the construction, takeover and maintenance of the works.

2. Subject to condition 3, no in-stream activity is permitted in the waters of the McLeod River and tributaries between September 1 and July 15 of the following year in order to protect spawning and incubation of fish.

3. In-stream work between September 1 and July 15 of the following year will be accommodated provided that:

   (a) isolation techniques are used;
   (b) the Canadian Water Quality Guidelines for suspended solids are met; specifically, that suspended solids derived from construction activities shall not exceed 10 mg/L when background levels are ≤ 100 mg/L, or 10% of background levels when background levels are > 100 mg/L;
   (c) monitoring of suspended solids occurs above and below the construction site during and immediately following any in-stream activity;
   (d) construction activities are temporarily suspended if the levels in condition 3(b) are exceeded. Prior to resuming construction, additional mitigation measures shall be implemented to reduce the levels of suspended sediments introduced into the watercourse; and,
   (e) Cardinal submits a monthly report to the Controller of Water Resources (the

4. The deposition of deleterious material in the McLeod River and tributaries is prohibited.

5. Cardinal shall identify and evaluate all sites with potential for enhancement of wintering habitat within the restored McLeod River channel. Cardinal shall submit by December 31, 1998 to the Natural Resources Service, Northern East Slopes Region, a proposal containing evaluations and designs for those sites with high potential for enhancement. Construction of any identified wintering habitat will take place according to the time frames authorized under this approval.

6. Cardinal shall maintain stream flow downstream from individual construction sites at all times. The water handling and drainage plans proposed by the construction contractors for any of the watercourse crossings shall be reviewed and approved by an officer of the Land and Forest Service and/or the Natural Resources Service prior to implementation.

7. Where portions of the railway right-of-way slopes to the watercourse, Cardinal shall install adequate controls to prevent erosion and siltation.

8. Culverts must be designed, installed, and maintained to allow upstream passage of fish on fish bearing streams and streams with potential to support fish. Cardinal shall install the culverts that will allow upstream passage of fish at the same general slope as the existing stream channel bed.

9. After the end of the Cheviot Mine Project and the decommissioning of the rail line, Cardinal shall remove the culverts, and stabilize and reclaim the bed and banks of the watercourses affected.

10. Disturbance of the bed and banks of the McLeod River and tributaries arising from any activity or equipment used in the project is to be kept to a minimum and confined to the immediate work site.

11. With the exception of the McLeod River Channel Restoration and Realignment described in the Application, the bed and banks of the McLeod River and tributaries shall be restored to their original contours, concurrently with project completion.

12. Cardinal shall carry out debris disposal, cleanup, and reclamation concurrently with the operations.

13. All disturbed areas are to be stabilized and reclaimed within one growing season; interim measures must be implemented to prevent short-term erosion problems.

14. Cardinal shall implement a Harlequin Duck mitigation plan, including the retention of a Biologist on site, for the construction period, and shall continue its Harlequin ducks monitoring program for the duration of the Cheviot Mine Project. Ongoing reports shall be submitted to the Controller each year during the life of the project.

15. Cardinal shall submit to the Controller an as-constructed report, complete with plans of the works, upon completion of the railway restoration.

16. A copy of the permit is to be available at the job site during construction.

17. This authority to restore the railway and construct its related structures expires on December 31, 2001

Department of Environmental Protection

_____

Manager, Regional Support
Northeast Boreal Region

Government of Canada / Gouvernement du Canada

Fisheries and Oceans / Pêches et Océans

September 29, 1998

Mr. F.J. Munn
Project Manager
Cardinal River Coals Limited
Bag Service 2570
Hinton, Alberta T7V 1V5

Your file / Votre référence

Our file / Notre référence

AB94-052-2

Dear Mr. Munn:

Re: Authorization for the harmful alteration, disruption or destruction of fish habitat pursuant to Subsection 35(2) of the *Fisheries Act*.

The harmful alteration, disruption or destruction of fish habitat arising from the development of the Cheviot Mine Industrial Complex, is hereby authorized pursuant to Subsection 35(2) of the *Fisheries Act*. This Authorization shall be conditional upon implementation of the mitigation and compensation measures specified on the attached document. Failure to comply with any of the conditions in this Authorization may result in contravention of Section 35 of the *Fisheries Act*.

The environmental impacts of this undertaking have been reviewed by a joint federal / provincial review panel in accordance with the *Canadian Environmental Assessment Act*. The conclusions of the Joint Review Panel are presented in the report entitled "Report of the EUB-CEAA Joint Review Panel, Cheviot Coal Project, Mountain Park, Alberta", issued in June, 1997.

Please be advised that this Authorization does not imply authorization of this undertaking in accordance with any section of the *Fisheries Act* other than Section 35, nor does it supersede the requirements of any other federal, provincial or municipal legislation. Further, this Authorization applies only to the above referenced project components. Any future applications for authorizations pursuant to the *Fisheries Act* will be assessed on an individual basis.

Please do not hesitate to call Mr. Garry Linsey at (204) 984-2505 should you have any questions or require additional information.

Yours sincerely,

J.N. Stein
Habitat Management Division
Central and Arctic Region

cc: G. Linsey (DFO, Winnipeg)
J. Cooley (DFO, Burlington)
K. Crutchfield (AEP, Edmonton)
D. Hodgins (Parks, Jasper)
S. Faulkner (DOJ, Edmonton)
R. Pierce (DFO, Sarnia)
D. Robinson (DFO, Ottawa)
T. Swerdfager (DOE, Edmonton)
R. Christie (CEAA, Edmonton)

Freshwater Institute

Fisheries and Oceans
Pêches et Océans

Authorization No./N° de l'a

AUTHORIZATION FOR WORKS OR UNDERTAKINGS AFFECTING FISH HABITAT
AUTORISATION POUR DES OUVRAGES OU ENTREPRISES MODIFIANT L'HABITAT DU POISSON

Authorization issued to: Cardinal River Coals Ltd.

Autorisation délivrée à :

Name: F. J. Munn
Nom: Project Manager

Address: Bag Service 2570
Adresse: Hinton, Alberta
T7V 1V5

Telephone No.: (403) 892-5190
No de Téléphone:

Location of Project/Emplacement du projet

The project is located in the County of Yellowhead approximately 12 km south of the Hamlet of Cadomin, Alberta and consists development earthworks and construction activities associated with the shop/office complex, pre-development earthworks and reliminary construction activities associated with the coal processing plant and related infrastructure and pre-development dis underground water from abandoned mines. These works are collectively described as the *Cheviot Mine Industrial Complex*. descriptions of these proposed works are provided in "The Cheviot Mine Project Shop/Office – Coal Processing Plant Complex Construction Application" (October, 1997), the "Pre-Development License Application for Earthwork and Construction Activities Mine Facilities" (December, 1997) and the "Pre-Development License Application for Earthwork and Construction Activities Ch Mine Facilities – Supplementary Information Report" (April, 1998).

Valid Authorization Period/Période de validité

From/De September 28, 1998. To/À Until all conditions of this Authorization are met to t satisfaction of the Department of Fisheries and Oc

Description of Works or Undertakings (Type of work, schedule, etc.)
Description des ouvrages ou entreprises (Genre de travail, calendrier, etc.)

Harris Creek

1. Diversion to align the channel with the proposed culvert crossing.
2. Installation of a multi-plate culvert crossing to accommodate a haulroad into the future Harris Creek mining area.
3. Diversion to accommodate construction of the plant area sedimentation pond.
4. Construction of a dam to create a water reservoir as a source of plant make-up water.

Cheviot Creek

1. Construction of a dam to permit disposal of fine refuse produced from the coal processing plant.
2. Installation of a culvert crossing to accommodate an access road from the Grave Flats Road to the mine facilities.
3. Diversion to accommodate construction of the shop area sedimentation pond.

Fisheries and Oceans
Pêches et Océans

Authorization No./N° de l

AUTHORIZATION FOR WORKS OR UNDERTAKINGS AFFECTING FISH HABITAT
AUTORISATION POUR DES OUVRAGES OU ENTREPRISES MODIFIANT L'HABITAT DU POISSON

Conditions of Authorization/Conditions de l'autorisation

1. GENERAL

1.1 All construction activities shall be undertaken as described in "The Cheviot Mine Project Shop/Office – Coal Proces Complex Construction Application" (October, 1997), the "Pre-Development License Application for Earthwork and Construction Activities Cheviot Mine Facilities" (December, 1997) and the "Pre-Development License Application fc Earthwork and Construction Activities Cheviot Mine Facilities – Supplementary Information Report" (April, 1998).

1.2 Following decommissioning of the mine and the rail line, the culverts and multi-plate installations, water reservoir an retention ponds shall be removed and the beds and banks of the watercourses stabilized and reclaimed. The fine re disposal site shall be reclaimed upon decommissioning.

1.3 Temporary erosion control measures shall be employed during and following all construction activities near watercc such time as permanent erosion control is established.

1.4 Material used for bank armouring shall be clean and free of fines and shall be sized to withstand erosion at design fl or greater.

1.5 Riprap bank armouring shall be installed as described in the "Pre-Development License Application for Earthwork an Construction Activities Cheviot Mine Facilities" (December, 1997).

1.6 Cardinal River Coals Ltd. (CRC) shall make every effort to restrict all instream work to the period from July 16 to Aug any year in fish bearing watercourses and in watercourses that flow into fish bearing waters and shall employ constru and mitigation methods which minimize the amounts of suspended sediment introduced into these watercourses. For remaining periods of any year, isolation techniques, as described in the "Pre-Development License Application for E and Construction Activities Cheviot Mine Facilities" (December, 1997), shall be employed in undertaking any constru activities within or immediately adjacent to the wetted perimeter of these watercourses.

1.7 During construction activities within or adjacent to the wetted perimeter of fish bearing watercourses and watercourse flow into fish bearing waters, suspended sediment concentrations shall be monitored immediately downstream of the construction site. Construction activities shall be temporarily terminated if suspended sediment concentrations exceec recommended for the protection of aquatic life in the "Canadian Water Quality Guidelines". Prior to resuming construc additional mitigation measures shall be implemented to reduce the levels of suspended sediments introduced into the watercourse.

2. COMPENSATION

2.1 As compensation for the harmful alteration, disruption or destruction (HADD) of fish habitat resulting from facilities development associated with the Cheviot Mine in the upper McLeod River basin, Cardinal River Coals Ltd. shall imple the program described in the "Letter of Intent to Compensate" appended to this authorization.

2.2 If it is determined by DFO, that the compensation program described in the "Letter of Intent to Compensate", referenca above, is not functioning as intended, CRC shall develop and implement an alternate compensation program in consul with and acceptable to DFO and AEP.

3. MONITORING

3.1 In addition to suspended sediment monitoring described in condition 1.7 above, monitoring programs for fish, benthic invertebrates, epilithic algae and water quality shall be implemented as described in the following documents:

- "Pre-Development License Application for Earthwork and Construction Activities Cheviot Mine Facilities" (Decemt

Fisheries and Oceans
Pêches et Océans

Authorization No./N° de l'

AUTHORIZATION FOR WORKS OR UNDERTAKINGS AFFECTING FISH HABITAT
AUTORISATION POUR DES OUVRAGES OU ENTREPRISES MODIFIANT L'HABITAT DU POISSON

- Authorization for the harmful alteration, disruption or destruction of fish habitat resulting from undertakings asso with the Cheviot Mine access corridor, issued to Cardinal River Coals Ltd. by the Minister of Fisheries and Oce August 17, 1998.
- Letter of Intent to Compensate.

3.2 Copies of reports for the above monitoring programs shall be provided to the Department of Fisheries and Oceans, Management Division.

4. MIGRATORY BIRDS

4.1 Cardinal River Coals Ltd. shall minimize vegetation clearing from May 1 to July 31 of any year, in order to minimize i on breeding migratory birds.

The holder of this authorization is hereby authorized under the authority of section 35(2) of the Fisheries Act, R.S.C., 1985, c. F. 14, to carry out the work or undertaking described herein.

This authorization is valid only with respect to fish habitat and for no other purposes. It does not purport to release the applicant from any obligation to obtain permission from or to comply with the requirements of any other regulatory agencies.

Failure to comply with any condition of this authorization may result in charges being laid under the Fisheries Act.

This authorization form should be held on site and work crews should be made familiar with the conditions attached.

Le détenteur de la présente est autorisé en vertu du paragraphe 35(2) de la Loi sur les pêches, L.R.C. 19 14, à exploiter les ouvrages ou entreprises décrits au présentes.

L'autorisation n'est valide qu'en ce qui concerne l'hab poisson et pour aucune autre fin. Elle ne dispense pe requérant de l'obligation d'obtenir la permission d'aut organismes réglementaires concernés ou de se conf leurs exigences.

En vertu de la Loi sur les pêches, des accusations po être portées contre ceux qui ne respectent pas les co prévues dans la présente autorisation.

Cette autorisation doit être conservée sur les lieux de travaux, et les équipes de travail devraient en connaît conditions.

Date of Issuance SEPTEMBER 29/98

Approved by

Title MANAGER, HABITAT MANAGEMENT

Date de délivrance

Approuvé par

Titre

CHEVIOT MINE
CARDINAL RIVER COALS LTD.
BAG SERVICE 2570, HINTON, ALBERTA, CANADA T7V 1V
PHONE: (403) 692-6190 FAX: (403) 692-6192

LETTER OF INTENT TO COMPENSATE FOR LOSS OF FISH HABITAT

In accordance with the Department of Fisheries and Ocean's *Policy for the Management of F Habitat*, and with particular reference to the principle of "No Net Loss of the Product Capacity of Habitats":

With respect to Cardinal River Coals Ltd. (hereafter "CRC")'s Application of October 14, 1997 regarding the Cheviot Mine Industrial Complex, CRC hereby agrees to undertake the following program to compensate for the harmful alteration, disruption or destruction (HADD) of fish habitat resulting from facilities development activities associated with the Cheviot Mine in the upper McLeod River basin, approximately 10 km south of the Hamlet of Cadomin in the County (formerly Municipal District) of Yellowhead No. 94. This development occurs early in the mine life and would not otherwise be compensated until mine lake development well into the mining phase.

The intent is to extend the range of a native fish species, establish a self-reproducing population isolated from potential genetic contamination, and increase angling opportunities in the upper McLeod River basin. Implementation of the program is subject to initiation of in-stream construction activities at the Cheviot Mine, scheduled for 1999.

CRC will:

1. In consultation with the Department of Fisheries and Oceans (DFO) and Albert Environmental Protection (AEP), finalize a fish transfer program to compensate for losses of fis habitat associated with facility development by the transfer of native Athabasca rainbow trou into the main stem of the upper McLeod River where natural barriers have prevented thei occupation. The details of the transfer program shall be finalized by December 31, 1998, and i any case at least one week prior to in-stream construction commencing at the site.

2. Develop the fish transfer program referenced in 1 (above) which will include: Finalizin source stock; enhancement of over-wintering habitat in the upper McLeod River basin; transfe of fish; and monitoring of the transfer; - the program being satisfactory to DFO and AEP.

3. Enhancement of over-wintering habitat in the Upper McLeod basin will include the construction of one or more ponds totalling about 1 hectare in area. Construction of this habita will be undertaken in 1999 and 2000, with fish transfers starting in 2000.

4. Monitor the rainbow trout transfer starting 3 years after the first transfer, by which ti natural reproduction and dispersal should have occurred. One index section will be establisl on the main stem of the McLeod River near the mouth of Prospect Creek to monitor numb (density). A population estimate would be obtained annually until a target density is reach Sampling will be conducted in late summer after expected fry emergence so that evidence successful reproduction could be obtained at the same time.

5. Ensure that the proposed program meets and complies with all applicable municip provincial and federal regulatory requirements. Of particular note are provincial requiremei for fish transfers and water resource development.

6. If it is determined that the program was not carried out as designed, carry out a modifications determined by the DFO and AEP to be reasonably necessary to enable t compensation program to function as designed.

The Department of Fisheries and Oceans, Habitat Management Division, in consultation wi Alberta Environmental Protection , will:

1. Provide technical advice regarding the design and implementation of the compensatio program, including monitoring requirements.

2. Provide advice regarding the proposed project, and offer assistance regarding th interpretation of any aspects of the "*Policy for the Management of Fish Habitat*" which requir clarification.

F. J. Munn
Manager, Cheviot Project
Cardinal River Coals Ltd.

Sept 17/98
Date

J. N. Stein, Manager
Habitat Management Division
Central and Arctic Region
Department of Fisheries and Oceans
Government of Canada

17/9/98
Date

Alberta
ENVIRONMENTAL PROTECTION

Environmental Service
Northern East Slopes Region
Office of the Regional Director

4th Floor Oxbridge Place
9820 – 106 Street
Edmonton, Alberta
Canada T5K 2J6

Telephone: (403) 427-6883
Fax: (403) 422-4192

September 29, 1998

Application No. 001-46972

Mr. Fred Munn
Project Manager
Cardinal River Coals Ltd.
Bag Service 2570
Hinton, Alberta
T7V 1V5

Dear Mr. Munn:

Re: Pre-development License Application for Earthwork and Construction Activities for the Cheviot Mine Facilities; EPEA Application No. 001-46972

Your application to construct, operate and reclaim a mine and a coal processing plant has been reviewed and Approval No. 46972-00-00 dated September 29, 1998 is enclosed.

In addition to this Approval, Cardinal River Coals Ltd. is responsible for obtaining all approvals pursuant to other applicable provincial acts.

This approval should not be taken to mean that Cardinal River Coals Ltd. has an authority under federal legislation. Cardinal River Coals Ltd. should contact Habitat Management, Central and Arctic Region, Fisheries and Oceans, 501 University Crescent, Winnipeg, Manitoba, R3T 2N6, Telephone: 204-984-2986 in relation to the application of federal laws relating to the *Fisheries Act (Canada)* and the Navigation Protection Program, Canadian Coast Guard, 201 North Front Street, Suite 703, Sarnia, Ontario, N7T 8B1, Telephone: 519-383-1862 relating to the *Navigable Waters Protection Act*.

Prior to construction and through construction, operation and reclamation of the mine and coal processing plant, liaison must be maintained with Mr. Bruce Cartwright, Inspector, Alberta Environmental Protection, 2nd Floor, Provincial Building, #203, 111 – 54 Street, Edson, Alberta, T7E 1T2; telephone 403/723-8265; fax 403/723-7963.

I would like to state that the approval I have issued does not authorize under EPEA and its regulations any further activities and components associated with the mine and processing plant beyond those described in the pre-development application. Prior to commencing further activities related to the mine and processing plant, Cardinal River Coals Ltd. will have to apply for an amendment to this approval which will be reviewed under EPEA and its regulations.

Please note that Section 84 of the *Environmental Protection and Enhancement Act* may provide a right o appeal to this decision to the approval holder by submitting a Notice of Objection to the Alberta Environmental Appeal Board (William A. Tilleman, Chair). There may be a strict time line for filing such an appeal. For further information, please contact the Board Secretary at 400, Alberta Treasury Branches Plaza, 9925 – 109 Street, Edmonton, Alberta, T5K 2J8; telephone 427-6207, fax 427-4693.

Should you have any questions or comments pertaining to this approval, please call me at 403/723-8357 or Neil Chymko at 403/427-5445.

Yours truly

W.S. Macdonald, P. Eng.
Director
Northern East Slopes Region

Alberta
ENVIRONMENTAL PROTECTION

APPROVAL

ENVIRONMENTAL PROTECTION AND ENHANCEMENT ACT

APPLICATION NO.	**001-46972**
APPROVAL NO.	**46972-00-00**
EFFECTIVE DATE	**September 29, 1998**
EXPIRY DATE	**September 1, 2008**
APPROVAL HOLDER	**Cardinal River Coals Ltd.**

Pursuant to Division 2, of Part 2, of the Environmental Protection and Enhancement Act, S.A. 1992, c.E-13.3, as amended, approval is granted subject to the attached terms and conditions for the following activity:

opening up, operation and reclamation of a coal mine and construction, operation and reclamation of a coal processing plant.

_____

Director

_____

Date

TERMS AND CONDITIONS

PART 1: DEFINITIONS

1.1: Definitions

1.1.1 All definitions from the **Act** and the **regulations** apply except where expressly defined in this approval.

1.1.2 In all PARTS of this approval:

(a) "**Act**" means the *Environmental Protection and Enhancement Act*, S.A. 1992, c.E-13.3, as amended;

(b) "**air contaminant**" means any solid, liquid or gas or combination of any of them in the atmosphere resulting directly or indirectly from the activities of man;

(c) "**application**" means written submissions to the **Director** in respect of application number 001-46972 and any subsequent applications for amendments of approval number 46972-00-00;

(d) "**daily determination of concentration**" means the determination of the concentration of a water substance or parameter in any sample by procedures authorized in this approval, and if more than one sample is collected and analyzed per **day**, the arithmetic average of their analytical results shall be considered as the **daily determination of concentration**;

(e) "**day**" means any sampling period of 24 consecutive hours;

(f) "**Director**" means the **Director** responsible for this approval unless otherwise specified;

(g) "**disturbed land**" means any land disturbed in any manner in association with the activity which is the subject of this approval;

(h) "**grab sample**" means an individual sample collected in less than 30 minutes and which is representative of the substance sampled;

(i) "**incompatible substances**" means substances which when mixed can produce effects which are harmful to human health or the environment such as heat, pressure, fire, explosion, violent reaction, toxic dusts, mists, fumes or gases, or flammable fumes or gases and include, but are not limited to, those substances listed in Appendix 5 of the *Guidelines for Industrial Landfills*, June 1987, Alberta Environmental Protection, as amended;

(j) "**local environmental authority**" means the Department of Environmental Protection, within the Province of Alberta, or the agency that has the equivalent responsibilities for any particular jurisdiction outside the Province;

TERMS AND CONDITIONS

(k) "**major pond**" means a **mine wastewater handling facility** that receives **mine wastewater** from active mining areas, dumping locations, the plant or maintenance shop areas and discharges to the environment;

(l) "**maximum daily**" means the value not to be exceeded by any **daily determination of concentration**;

(m) "**maximum daily average**" means the value which is not to be exceeded as determined by the arithmetic average of all **daily determinations of concentration** collected as part of monitoring per Table 4.2-B and 4.2-C or as specified during any month;

(n) "**mine wastewater**" means any liquids originating from the operation of the plant or mine excluding runoff from undeveloped areas;

(o) "**mine wastewater handling facilities**" means the parts of the mine that collect, transport, store or treat **mine wastewaters**;

(p) "**minor pond**" means a **mine wastewater handling facility** which has met all approval limits in the past year or receives **mine wastewater** from a reclaimed area and discharges to the environment;

(q) "**NTU**" means turbidity measured in Nephelometric Turbidity Units;

(r) "**quarter year**" means a time period of three consecutive months designated as January, February and March; or April, May, and June; or July, August, and September; or October, November, and December;

(s) "**regulations**" means the **regulations** issued pursuant to the **Act**, as amended;

(t) "**sediments**" means all fine sands, silts and clays or any other fines resulting from the settlement of impounded water or wastewater;

(u) "**settling pond**" means containment structures to treat and discharge **mine wastewater**;

(v) "**storm event**" is a precipitation event where the actual measured intensity over a specific duration is greater than or equal to the intensity calculated by the following equation:

$$\log(i) = -0.70 * \log(t) + 1.40$$

where: i = storm intensity (mm/hour)
t = storm duration (hour)

This equation is valid only for determining storm intensities of 0.5 hour to 168 hours duration.

TERMS AND CONDITIONS

(w) "**stream**" means any fluid flow, discharge or release;

(x) "**summer**" means the time period between April 1 and September 30;

(y) "**surface soil**" means the undisturbed soil profile made up of the following:

(i) litter layer, and A, B and BC horizons as defined in the *Canadian System of Soil Classification*, Second Edition, 1987, and rated as good, fair or poor as described in the *Soil Quality Criteria Relative to Disturbance and Reclamation*, 1987, Table 10, page 30, or

(ii) organic horizons;

(z) "**tank**" means a stationary device, designed to contain an accumulation of a substance, which is constructed primarily of non-earthen materials that provide structural support, and without precluding the generality of the foregoing, may include substances such as wood, concrete, steel and plastic;

(aa) "**TSS**" means the total suspended solids or nonfilterable residue measured in milligrams per litre;

(bb) "**volume estimate**" means a technical evaluation based on the sources contributing to the release, including, but not limited to, pump capabilities, water meters, and batch release volumes;

(cc) "**waste storage area(s)**" means the area(s) designated for **waste** container storage and/or waste tank storage as described in the **application**;

(dd) "**week**" means any consecutive 7-day period;

(ee) "**winter**" means the time period between October 1 and March 31; and

(ff) "**year**" means calendar year.

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PART 2: GENERAL

2.1: General

2.1.1 The approval holder shall immediately report by telephone any contravention of the terms and conditions of this approval to the Director of Enforcement and Monitoring at 1-403-422-4505.

2.1.2 The approval holder shall submit an **application** for renewal to the **Director** a minimum of six months prior to the approval expiry date or otherwise as specified in writing by the **Director**.

2.1.3 Any conflict between the **application** or any document and the terms and conditions of this approval shall be resolved in favour of the approval.

2.1.4 The terms and conditions of this approval do not affect any rights or obligations created under any other approval issued by Alberta Environmental Protection.

2.1.5 The mention of trade names, commercial products or named technologies in this approval does not constitute an endorsement or recommendation by Her Majesty the Queen in Right of Alberta, her employees, agents and the **Director** for general use.

2.1.6 The terms and conditions of this approval are severable. If any term or condition of this approval or the application of any term or condition is held invalid, the application of such term or condition to other circumstances and the remainder of this approval shall not be affected thereby.

2.1.7 The approval holder shall only conduct activities described in the **application** and authorized by this approval.

2.1.8 The approval holder shall notify the **Director** in writing within 30 days of all changes in the corporate status of the approval holder.

2.1.9 If the approval holder monitors for any substances or parameters which are the subject of operational limits as set out in this approval more frequently than is required and using procedures authorized in this approval, then the approval holder shall provide the results of such monitoring as an addendum to the reports required by this approval.

2.1.10 All abbreviations used in this approval follow those given in *Standard Methods for the Examination of Water and Wastewater* published jointly by the American Public Health Association, the American Water Works Association, and the Water Environment Federation, as amended, or as otherwise specified in the approval.

2.1.11 The approval holder shall notify the **Director** in writing within 30 days of operations ceasing permanently.

2.1.12 The approval holder shall operate and maintain all treatment facilities and monitoring equipment including ensuring effective performance, trained operators, regular inspections, and adequate laboratory and process controls which include quality assurance procedures.

2.1.13 The approval holder shall notify a Conservation and Reclamation Inspector in writing prior to commencement of drilling programs within the Alberta Energy and Utilities Board Mine Permit Area.

2.2: Record Keeping

2.2.1 The approval holder shall record and retain all the following information for a minimum of ten **years**:

(a) the names and addresses of all persons who discover any contravention of the **Act**, the **regulations** or this approval;
(b) the names and addresses of all persons who take any remedial action arising from the contravention of the **Act**, the **regulations** or this approval; and
(c) a detailed description of the remedial measures taken in respect of a contravention of the **Act**, the **regulations** or this approval.

2.2.2 The approval holder shall record and retain all the following information in respect of any sampling conducted or analyses performed for a minimum of ten **years**, or otherwise as specified in writing by the **Director**:

(a) the place, date and time of sampling;
(b) the dates the analyses were performed;
(c) the analytical techniques, methods or procedures used in the analyses;
(d) the names of the persons who collected and analyzed each sample; and
(e) the results of the analyses.

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2.3: Analytical Requirements

2.3.1 Collection, analysis of samples and reporting shall be conducted in accordance with the following or otherwise as specified in writing by the **Director**:

(a) for **mine wastewater**, groundwater, waterworks and **domestic wastewater** parameters:

(i) the *Standard Methods for the Examination of Water and Wastewater* American Public Health Association, American Water Works Association, Water Environment Federation, as amended; or,

(ii) the *Methods Manual* for *Chemical Analysis of Water and Wastes*, Alberta Environmental Center, as amended;

(b) for biological monitoring:

(i) the *Guidelines for Monitoring Benthos in Freshwater Environments*, Environment Canada, January, 1993, as amended; and

(c) for toxicity testing:

(i) the *Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout*, Environment Canada, Environmental Protection Series 1/RM/13, July 1990, as amended;

(ii) the *Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Daphnia Magna*, Environment Canada, Environmental Protection Series 1/RM/14, July 1990, as amended.

2.3.2 The preservation, storage, and handling of all samples collected at the sampling locations identified in this approval shall be in such a manner that the validity of the samples is not compromised. The analysis of samples shall be in a laboratory with documented quality assurance and quality control programs, including participation in interlaboratory studies.

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2.4: Workplans

2.4.1 The approval holder shall develop workplans, including objectives, methodology and schedule of implementation, that are designed to:

(a) provide a template for the proposed mine end pit lakes, by establishing an ongoing monitoring program into the aquatic ecology of existing or planned lakes at the Luscar Mine;
(b) establish minimum instream flow values in the drainages directly affected by the mine, in particular the McLeod River, Mackenzie Creek, and Redcap Creek; and carry out long-term monitoring of groundwater and surface water quality, including appropriate biomonitoring and fisheries monitoring;
(c) further evaluate levels of iron, aluminum, copper and nitrogen in receiving waters through the use of modeling; to review available control technologies for metals, nutrients and other compounds within the settling ponds; and to prevent a net increase of nitrogen loadings to the McLeod River from the combined effects of the Luscar Mine and the Cheviot Mine; and to assess the relevance of current water quality guidelines to effluent discharges;
(d) develop a fisheries compensation program related to establishment of fisheries at the mine; monitor the success of its programs to re-establish native rainbow trout stocks and identify potential alternative areas for habitat enhancement should end pit lakes not prove to be successful;
(e) develop a carnivore compensation program for onsite and offsite measures related to maintaining regional carnivore populations, including effectively replacing habitat for individual carnivore species affected by the Cheviot Mine;
(f) monitor the impacts of the increased traffic on wildlife populations along the Grave Flats Road, and make any adjustments necessary to reduce wildlife mortality to acceptable levels;
(g) carry out studies that:

(i) examine current wildlife movement patterns and dispersal across and throughout the mine site and to establish the likely minimum conditions (e.g. width, degree of cover) necessary for wildlife corridors to be effective and for dispersal to be successful in terms of establishing home ranges and successful reproduction;
(ii) establish how such corridors might be accommodated within the mine plan;
(iii) monitor impacts to elk on mine permit lands and land peripheral to the mine disturbance area and to propose mitigation strategies that will enable elk to continue to effectively use these areas;
(iv) monitor and identify new mineral licks;
(v) identify and assess the location, characteristics, value to wildlife and fisheries, and connectivity of riparian features in the mine permit area and to propose mitigation strategies to reduce impacts on these areas;

(h) monitor the changes to public access and use patterns resulting from the development, and advise the **Director** if any of these appear to have unduly increased the risk of wildlife habitat displacement or of either legal or illegal wildlife mortality; and

TERMS AND CONDITIONS

(i) develop a program for Harlequin ducks that:

(i) employs all reasonable methods available to reduce impacts on Harlequin duck populations, including reducing disturbance levels in riparian areas of the McLeod River, MacKenzie Creek and Cardinal River watersheds;
(ii) continues to monitor these populations; and
(iii) maintains a viable population.

2.4.2 The approval holder shall submit the workplans specified in 2.4.1 by October 31, 1998 unless otherwise authorized in writing by the **Director**.

2.4.3 The approval holder shall implement the workplans specified in 2.4.1 as authorized in writing by the **Director**.

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PART 3: CONSTRUCTION

3.1: General

3.1.1 If construction of the pre-development activities as described in the **application** has not commenced by December 31, 2001, the approval holder shall apply for an amendment to this approval unless otherwise authorized in writing by the **Director**.

3.2: Mine Wastewater

3.2.1 The approval holder shall design and construct **settling ponds** to meet all the following minimum requirements:

(a) located to capture all **mine wastewater** for a specific area;
(b) achieve "settleable solids" for all water inflows, up to the mine specific **storm event** (settleable solids = 0.5 ml/L);
(c) to withstand a washout from a 1 in 100 year flood;
(d) allow all weather access for monitoring, dredging and maintenance;
(e) minimize short circuiting of water flow and thereby achieve adequate settling retention time;
(f) prevent the escape of floating hydrocarbons;
(g) provide reliable flow measurement, if so designated in TABLE 4.2-B; and
(h) minimize erosion in the discharge channel.

3.2.2 Prior to the commissioning of the Loadout Pond, Plantsite Pond and Shop Pond, the approval holder shall contain and treat **mine wastewater** by use of ditches, sumps, straw bales, filter fences or other such structures. These structures shall be subject to the limits, monitoring and reporting requirements prescribed for major ponds in 4.2.

3.3: Land Conservation

3.3.1 The approval holder shall salvage all **surface soil** on slopes less than 22°.

3.3.2 The approval holder shall stockpile all **surface soil** as follows:

(a) stockpile foundations shall be stable;
(b) stockpiles shall be stabilized to control water erosion;
(c) stockpiles shall be accessible and retrievable; and
(d) stockpiles shall be revegetated.

3.3.3 The approval holder shall immediately suspend **surface soil** salvage when:

(a) wet or frozen field conditions will result in the degradation of **surface soil**; or
(b) high wind velocities, any other field conditions or mine operations will result in the degradation, of **surface soil**; or
(c) directed in writing by a Conservation and Reclamation Inspector.

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3.3.4 The approval holder shall only recommence **surface soil** salvage when suspended under 3.3.3 if:

(a) field conditions referred to in 3.3.3 no longer exist; or
(b) direction for a change in **surface soil** salvage procedures is received in writing from a Conservation and Reclamation Inspector.

3.3.5 The approval holder shall minimize vegetation clearing from May 1 to July 31 to reduce the impact on breeding bird populations. When proposing to clear vegetation within this period, the approval holder shall obtain authorization in writing from a Conservation and Reclamation Inspector prior to vegetation clearing.

3.4: Fisheries and Harlequin ducks

3.4.1 With respect to fisheries mitigation:

(a) The approval holder shall identify and evaluate all sites with potential for enhancement of wintering habitat within the restored McLeod River channel. Prior to construction work in the restored channel or by December 31, 1998, whichever is earliest, the approval holder shall submit for the approval of the **Director**, a proposal containing evaluations and design for those sites with high potential for enhancement. The proposal shall also include an evaluation to identify sites with the potential for enhancement of wintering habitat within the McLeod River system upstream of the falls above the confluence with Whitehorse Creek.
(b) The approval holder shall employ construction and mitigation methods which minimize the amounts of suspended sediment introduced into fish bearing watercourses and in watercourses that flow into fish bearing waters.
(c) Subject to 3.4.1(d), the approval holder shall only conduct in-stream activities in the McLeod River and tributaries from July 16 to August 31 of any **year** in order to protect spawning and incubation of fish.
(d) In-stream work between January 1 and July 15 or between September 1 and December 31 of each **year** will be accommodated provided that:

(i) isolation techniques are used;
(ii) the *Canadian Water Quality Guidelines* for suspended solids levels for the protection of aquatic life are met; specifically, that suspended solids derived from construction activities shall not exceed 10 mg/L when background levels are ≤ 100 mg/L, or 10% of background levels when background levels are > 100 mg/L;
(iii) monitoring of suspended solids occurs above and below the construction site during and immediately following any in-stream activity; and
(iv) construction activities are temporarily suspended if the levels in 3.4.1(d)(ii) are exceeded. Prior to resuming construction, additional mitigation measures shall be implemented to reduce the levels of suspended sediments introduced into the watercourse.

3.4.2 With respect to Harlequin duck mitigation, the approval holder shall implement the Harlequin duck mitigation plan described in the *Cheviot Mine Project Access Corridor Licence Application*, including the retention of a biologist on site, for the construction period and shall continue the Harlequin duck monitoring program for the duration of the Cheviot Mine Project.

PART 4: OPERATIONS, LIMITS, MONITORING AND REPORTING

4.1: Air

Operations

4.1.1 The approval holder shall control dust and **air contaminant** emissions, as described in the **application** or as directed in writing by a Conservation and Reclamation Inspector.

4.2: Mine Wastewater

Operations

4.2.1 The approval holder shall not release any substances from the mine to the surrounding watershed except as authorized under this approval.

4.2.2 With respect to the discharge of **mine wastewater**:

(a) The approval holder shall only discharge **mine wastewater** from the following **mine wastewater handling facilities**:

MAJOR PONDS	MINOR PONDS
Loadout Pond	
Plantsite Pond	
Shop Pond	

(b) The approval holder shall submit written notification to the **Director** prior to discharge of any **mine wastewater** from a new **settling pond** to the surrounding watershed.

4.2.3 The water from the Thornton Creek underground mine workings shall be pumped or handled in a manner such that the *Alberta Water Quality Guideline for the Protection of Freshwater Aquatic Life-Dissolved Oxygen* is met prior to discharge into Thornton Creek.

4.2.4 Should there be evidence of precipitates in Thornton Creek downstream of the discharge, the approval holder shall construct a **settling pond** for the water pumped from the Thornton Creek underground mine workings when requested in writing from the **Director**.

4.2.5 All fuel and chemical storage areas shall have secondary containment to contain spills and leaks.

4.2.6 All storage **tanks** shall meet the requirements in the *Secondary Containment for Above Ground Storage Tanks*, Alberta Environmental Protection, September 25, 1995, as amended.

4.2.7 The approval holder shall not use flocculants unless otherwise authorized in writing by the **Director**.

4.2.8 Flocculant facilities are to be sited to avoid washout from a 1 in 20 year flood and must be secure from unauthorized entry or tampering.

4.2.9 The approval holder shall determine **TSS** from turbidity in the following manner:

(a) for turbidity values less than or equal to 50 **NTU**, the corresponding **TSS** value is as follows:

Turbidity Range NTU	TSS Value (mg/l)
>0 – 10	3.0
>10 – 20	7.0
>20 – 30	10.0
>30 – 40	17.0
>40 - 50	23.0

(b) for turbidity values greater than 50 **NTU**, the sample shall be analyzed for **TSS**.

4.2.10 The **maximum daily** limits for **TSS** in TABLE 4.2-A shall be waived for a period of 48 hours after a **storm event** has occurred at the mine.

4.2.11 Prior to construction, the approval holder shall develop, document and implement a Best Management Practices (BMP) Plan which is based on the *Best Management Practices and Spill Response Guidance Document*, Industrial Waste and Wastewater Branch, July 1994, as amended. The approval holder shall keep the BMP Plan current to mine operations.

Limits

4.2.12 Releases from the **mine wastewater handling facilities** shall not exceed the limits specified in TABLE 4.2-A.

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TABLE 4.2-A: LIMITS – MINE WASTEWATER RELEASES

PARAMETER	LIMIT	
	maximum daily average (for any month)	**maximum daily**
Total Suspended Solids (**TSS**)	50 mg/L	350 mg/L
pH	6.0 - 9.5 pH units	
Floating Solids	not present except in trace amounts	
Visible Foam	not present except in trace amounts	
Oil or other substances	not present in amounts sufficient to create a visible film or sheen	
Acute Lethality Test Using Rainbow Trout (*Oncorhynchus mykiss*)	100% survival in 100% **mine wastewater** sample (undiluted)	

Monitoring

4.2.13 Monitoring requirements in 4.2 shall commence upon the start of construction of the mine.

4.2.14 The approval holder shall monitor all releases from **mine wastewater handling facilities** as specified in TABLE 4.2-B & 4.2-C. The approval holder shall include the new **settling ponds** in the monitoring as a **major pond** as described in 4.2.

4.2.15 The approval holder shall monitor ambient conditions in the McLeod River at MR-1A and MR-2 for the parameters and frequency specified in TABLE 4.2-B. Should mine activities be conducted upstream of the MR-1A site, then MR-1 shall be used instead of MR-1A.

4.2.16 The approval holder shall conduct inspections daily of those **minor ponds** using flocculants and all **major ponds**, unless there is no discharge from the pond, and inspections shall include:

(a) checking that all flocculant stations are functioning properly;
(b) a visual check that discharge is not abnormally turbid; and
(c) taking a **mine wastewater** sample for analysis, if the discharge appears abnormally turbid (i.e. greater than 50 **NTU**), and comparing with the limits of Table 4.2-A.

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TABLE 4.2-B: MAJOR PONDS - MONITORING AND REPORTING REQUIREMENTS

MONITORING				REPORTING		REPORT
Parameter, Test or Reporting Requirement	Frequency	Sample Type	Sampling Location	Monthly	Annual	To
Flow (in cubic metres/D)	daily	Weir	A (only ponds using flocculants)	Yes (On or before the end of the month following the month in which the information was collected) Number of Copies Required: 1	Yes (Provide annual summary of data by March 31) Number of Copies Required: 1	Director
Total Suspended Solids (in mg/L)	1/week and when turbidity >50 NTU	Grab	A & B			
Turbidity (NTU)	3.5/week in summer 1/week in winter	Grab	A & B			
pH	3.5/week in summer 1/week in winter	Grab	A & B			
Nitrate-Nitrogen (in mg/L)	1/month until the start of mining, then 1/week thereafter	Grab	A & B			
Visual: foam and solids oil and grease	daily	N/A	N/A			

A = the sampling location for compliance monitoring of Mine Wastewater (i.e., pond perimeter or discharge stream)
B = MR1 (or MR1-A) and MR-2

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TABLE 4.2-C: MINOR PONDS - MONITORING AND REPORTING REQUIREMENTS

MONITORING				REPORTING		REPORT
Parameter, Test or Reporting Requirement	Frequency	Sample Type	Sampling Location	Monthly	Annual	To
Total Suspended Solids (in mg/L)	prior to discharge and 1/week thereafter	Grab	A	Yes (as in Table 4.2-B)	Yes (as in Table 4.2-B)	Director
pH	prior to discharge and 1/week thereafter	Grab	A			
Nitrate-Nitrogen (in mg/L)	monthly	Grab	A			
Visual: - floating solids - visible foam - oil sheen etc.	prior to discharge and 1/week thereafter	N/A	N/A			
A = the sampling location for compliance monitoring of Mine Wastewater (i.e., pond perimeter or discharge stream)						

4.2.17 To provide information to determine total nitrogen loadings in the McLeod River, the approval holder shall sample and analyze for nitrate/nitrite, ammonia, and total kjeldahl nitrogen (TKN) at MR-4 once per week during the summer and once per month during the winter.

4.2.18 The approval holder shall monitor the Thornton Creek underground mine pumped discharge as specified in TABLE 4.2-D.

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TABLE 4.2-D: UNDERGROUND MINE DISCHARGE MONITORING AND REPORTING REQUIREMENTS

PARAMETER	FREQUENCY	SAMPLE TYPE	LOCATION	REPORT	REPORT TO
Total Suspended Solids (TSS)	once a month	Grab	A & B	Monthly	Director
pH	once a month	Grab	A & B		
TDS	once a month	Grab	A & B		
Dissolved Oxygen	once a month	Grab	A & B		
Sulfide	once a month	Grab	A & B		
Copper	once a month	Grab	A & B		
Iron	once a month	Grab	A & B		
Aluminium	once a month	Grab	A & B		
A = Thornton Creek upstream of the discharge B = Thornton Creek downstream from the discharge					

4.2.19 The approval holder shall sample the McLeod River upstream and downstream of mine operations at MR-1A and MR-2 on a **quarter year** basis. Should mine activities be conducted upstream of the MR-1A site, then MR-1 shall be used instead of MR-1A. These samples shall be analysed for all of the following:

(a) all inorganic parameters listed in the Guidelines for Freshwater Aquatic Life of the *Canadian Water Quality Guidelines*, 1988, CCREM, as amended; and
(b) BOD, BTEX, Color, Oil & Grease, Phenols, Total Phosphorus, Total Kjeldahl Nitrogen, Dissolved Oxygen, Sulfate, TDS, Temperature, Total Sulfide, TSS.

4.2.20 The approval holder shall continue the Benthic Invertebrate Biomonitoring Program in the McLeod River. The program shall:

(a) be conducted in the fall of 1999, 2000, 2001 and every second **year** thereafter;
(b) evaluate whether there have been changes in the benthic invertebrate community which are attributable to the effects of the mine effluent and, if so, the length of impact along the river;
(c) follow the protocol set out in *Guidelines for Monitoring Benthos in Freshwater Environments*, Environment Canada, January 1993.

4.2.21 The approval holder shall submit a proposal to the **Director** to monitor the epilithic chlorophyll A or other suitable measures that can be used to assess benthic algae in the McLeod River. The proposal shall outline a monitoring program that will:

(a) be conducted in the fall of 1999, 2001 and every second **year** thereafter;
(b) evaluate whether there have been changes in the benthic algae community which are attributable to the effects of the mine effluent and, of so, the length of impact along the river;
(c) include sufficient sites to determine impacts;
(d) include sufficient samples at each site to obtain reliable estimates and allow for statistical analyses; and
(e) be submitted by June 30, 1999, unless otherwise authorized in writing by the **Director**.

4.2.22 The approval holder shall implement the Epilithic Chlorophyll A Monitoring Proposal as authorized in writing by the **Director**.

4.2.23 The approval holder shall submit a Fish Monitoring Program Proposal and schedule for the main stem of the McLeod River below the falls, MacKenzie Creek and Redcap Creek to evaluate effects of mining on fish populations and fish habitat over time and the effectiveness of mitigation measures. The proposal shall:

(a) consider habitat capabilities, critical habitat areas, species distribution and species abundance;
(b) include a monitoring program to measure the success of the introduction of native Athabasca rainbow trout in the upper McLeod River above the falls; and
(c) be submitted to the **Director** by October 31, 1998, or another date as authorized in writing by the **Director** and implemented as authorized in writing by the **Director**.

4.2.24 The approval holder shall conduct a Substrate Monitoring Program in the McLeod River and tributaries prior to and following construction activities as described in the **application**.

4.2.25 For any problems that are identified by monitoring programs required in 4.2, the approval holder shall submit, for authorization in writing by the **Director**, a plan that outlines the mitigation measures to be implemented.

Reporting

4.2.26 The approval holder shall submit, under separate cover and for authorization in writing by the **Director**, a Turbidity **TSS** Evaluation Report by March 31, 2000, which will evaluate the relationship between turbidity and **TSS**.

4.2.27 The approval holder shall submit, for authorization in writing by the **Director**, a Storm Event Report by March 31, 1999, which evaluates the **storm event** equation for the mine.

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4.2.28 The results of water quality monitoring in the McLeod River as specified in 4.2.19 shall be compared with provincial and federal guidelines and submitted to the **Director**, under separate cover, as a Watershed Water Quality Report by March 31 of each **year**.

4.2.29 The approval holder shall submit the Benthic Invertebrate Biomonitoring Program Report to the **Director** by June 30 of the **year** following the sampling. The 1999 and 2000 reports shall be submitted by February 28 of the following **year** in order to modify construction practices, if necessary, for the upcoming open water season.

4.2.30 The approval holder shall submit under separate cover the Epilithic Chlorophyll A Monitoring Report to the **Director** by March 31 of the **year** following the sampling.

4.2.31 The approval holder shall submit the Substrate Monitoring Report, under separate cover, by March 31, 2002, unless otherwise authorized in writing by the **Director**.

4.2.32 The monthly wastewater report shall include the following:

(a) monitoring data as required in Tables 4.2-B, 4.2-C and 4.2-D;
(b) comparison of monitoring data with limits in Table 4.2-A;
(c) in addition to reporting pursuant to 2.1.1, details of any approval contravention and follow-up action taken;
(d) identification of any flocculants added and the quantity used;
(e) any mine operations that would have an impact on the **mine wastewater** discharges, and
(f) the results of monitoring data collected pursuant to 3.4.1(d), including the occasions when exceedances occurred, the measured total suspended solids values, and the mitigation measures implemented.

4.2.33 The annual wastewater report shall include the following:

(a) a statistical summary of the **mine wastewater** monitoring results from 4.2. This shall include high, low and average values for every parameter routinely monitored;
(b) an assessment of the data relative to the limits in TABLE 4.2-A, including a trend analysis, using appropriate control charts or graphs to demonstrate performance;
(c) a summary and evaluation of the performance of all **mine wastewater handling facilities** including remarks on **sediment** accumulation, dredging activities, extensions and alterations of the facilities;
(d) a summary of total nitrogen loading at MR-4 and a comparison with the predictions in the Environmental Impact Assessment Report for the Cheviot Mine, Volumes 1-14;
(e) in addition to reporting pursuant to 2.1.1, details of any approval contravention and follow-up action taken; and
(f) a description of proposed mining activities in the upcoming **year** which may affect the **mine wastewater handling facilities**.

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4.3: Waste Management

Operations

4.3.1 The approval holder shall manage **wastes** in accordance with the following, unless otherwise authorized in writing by the **Director**:

(a) all recyclables shall be stored at the **waste storage areas**; and
(b) grease and edible waste shall be stored at the **waste storage areas**.

4.3.2 The approval holder shall only land treat contaminated soil in accordance with and pursuant to the *Code of Practice for the Land Treatment and Disposal of Soil Containing Hydrocarbon (Draft)*, as amended.

4.3.3 Hazardous **waste** or hazardous recyclables stored in **containers** or **tanks** shall be stored in accordance with *the Hazardous Waste Storage Guidelines*, Alberta Environmental Protection, June 1988, as amended.

4.3.4 All **containers** which hold **waste** or any empty unrinsed **containers** which held **waste**, shall be stored in the **waste storage area**.

4.3.5 **Wastes** shall only be transferred at designated transfer areas designed to contain spills and leaks.

4.3.6 All **waste** that is unloaded shall be immediately transferred to the **waste storage areas**.

4.3.7 The approval holder shall provide and maintain a minimum of 1.2 m of aisle space to allow inspection, unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment to any area of the **waste storage area**. Inspection aisles shall be arranged such that each **container** is exposed to view from at least one side.

4.3.8 The approval holder shall dispose of **waste** generated at the mine only to facilities holding a current approval under the **Act** or to facilities approved by a **local environmental authority** outside of Alberta.

4.3.9 **Incompatible substances** shall be prevented from mixing by a dyke, berm, wall or other methods.

4.3.10 The approval holder shall post a sign reading "Waste Storage Area" at the entrances to the **waste storage area**.

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Monitoring

4.3.11 The approval holder shall identify all **waste** generated at the mine, but this does not include **mine wastewater** or **air contaminant** emissions.

4.3.12 The approval holder shall measure and record the quantity of each **waste** generated in the previous **year**, and the disposal location for each **waste**.

Reporting

4.3.13 The approval holder shall compile all the information required by 4.3.11 and 4.3.12 in an Annual Waste Management Summary report as indicated in TABLE 4.3-A and pursuant to or in compliance with *Industrial Waste Identification and Management Options*, May 1996, as amended, and the *Alberta User Guide for Waste Managers*, May 1995, as amended.

TABLE 4.3-A: ANNUAL WASTE MANAGEMENT SUMMARY

Waste Name	Uniform Waste Code				Quantity (kg or L)		Disposal Location
	WC	PIN	Class	Mgmt	Hazardous	Non-hazardous	
TOTAL							

4.3.14 The Annual Waste Management Summary report for the preceding **year** shall be submitted to the **Director** by March 31, or another date as authorized in writing by the **Director**.

4.4: Groundwater

4.4.1 The approval holder shall continue the Groundwater Monitoring Program as described in the **application** unless otherwise authorized in writing by the **Director**.

4.5: Domestic Wastewater

4.5.1 The approval holder shall collect and contain all **domestic wastewater** at the mine.

4.5.2 The approval holder shall remove all **domestic wastewater** from the mine for treatment only to a municipal wastewater treatment facility holding a current approval under the **Act**.

4.6: Waterworks

4.6.1 All potable water used at the mine shall consist of bottled water or water obtained from a municipal water source holding a current approval under the **Act**.

PART 5: RECLAMATION

5.1: General

5.1.1 The approval holder shall apply to amend the approval at least six months prior to starting any final reclamation activities that include the dismantling and removal of all buildings, structures, or fixtures.

5.1.2 The approval holder shall carry out interim reclamation work, including slope stabilization, soil replacement, and seeding concurrent with operations.

5.2: Land Reclamation

5.2.1 The approval holder shall reclaim the land, through appropriate conservation and reclamation methods, to provide land having characteristics (soils, topography, vegetation and drainage) that result in a return of land capability at least equivalent to that existing prior to disturbance.

5.2.2 The approval holder shall remove all watercourse crossings as part of the final reclamation, unless otherwise authorized in writing by the **Director**.

5.3: Materials Placement, Backfilling and Contouring

5.3.1 The approval holder shall create a final landscape with free draining and nonerosive slopes.

5.3.2 The approval holder shall immediately suspend **surface soil** replacement when:

(a) wet or frozen field conditions will result in the degradation of **surface soil**; or
(b) high wind velocities, any other field conditions or mine operations will result in the degradation of **surface soil**; or
(c) directed in writing by a Conservation and Reclamation Inspector.

5.3.3 The approval holder shall receive direction in writing from a Conservation and Reclamation Inspector prior to disposing of **sediment** cleaned out from **settling ponds**.

5.4: Revegetation

5.4.1 The approval holder shall only use the following for revegetation:

(a) seed, for agronomic species, that is equivalent to Canada #1 seed and is free of prohibited and primary noxious weed; and
(b) seed, for native species that:
  (i) is free of prohibited and primary noxious weeds;
  (ii) has a count of 5 or less secondary noxious weed seeds per 25 g of seed; and
  (iii) has a count of 50 or less for other weed seeds per 25 g of seed.

5.4.2 The approval holder shall obtain and retain documentation that verifies that the seed used for revegetation meets the criteria specified in 5.4.1.

5.4.3 The approval holder shall, in consultation with a Conservation and Reclamation Inspector, continue to evaluate the opportunities for incorporating greater use of native species in revegetation.

5.5: Monitoring and Reporting

Monitoring and Research

5.5.1 The approval holder shall submit a proposal to the Director for a reclamation monitoring and research program to determine satisfactory methods for reclamation of disturbed land. The program shall:

(a) outline the objectives, methods and procedures to address areas where monitoring and research is warranted;
(b) consider factors such as seed mixtures and the opportunity to incorporate native species in revegetation plans;
(c) be submitted by December 31, 1999 unless otherwise authorized in writing by the **Director**; and
(d) be implemented as authorized in writing by the **Director**.

TERMS AND CONDITIONS

Reporting

5.5.2 In addition to reporting pursuant to 2.1.1, the approval holder shall immediately contact a Conservation and Reclamation Inspector when an emergency causes or requires a land surface disturbance that is not authorized by this approval.

5.5.3 The approval holder shall prepare an Annual Report that includes:

(a) a statement summarizing compliance with the requirements of this approval;
(b) a summary statement and maps of **disturbed land**, undisturbed areas, and reclaimed land;
(c) a summary statement and maps of **surface soil** salvage, storage and replacement;
(d) a summary statement and maps of materials handling, reclamation, revegetation progress and productivity;
(e) a summary of the monitoring and research required in 5.5.1 and the implications to operational reclamation plans, and
(f) any other information requested by the **Director**.

5.5.4 Fifteen copies of the Annual Report for the preceding **year** shall be submitted to the **Director** by March 31, or another date as authorized in writing by the **Director**.

_____ _____

Director Date

September 29, 1998 **File:** 60335

Mr. Fred Munn
Cardinal River Coals Ltd.
Bag Service 2570
Hinton, Alberta
T7V 1V5

Dear Mr. Munn:

RE: CHEVIOT MINE – PLANT SITE FACILITIES

Your $1,050.00 licence fee for this project is acknowledged (receipt No. 99404793 enclosed). Also enclosed is Interim Licence No. 22085 authorizing construction of structures associated with the pre-development activities of the Cheviot Mine in accordance with the *Water Resources Act*.

Please review all of the interim licence conditions.

Also, note that:

1. This interim licence does not supersede approvals required pursuant to other provincial acts.

2. This interim licence should not be taken to mean that you have an authority under federal legislation. You should contact **Habitat Management, Central and Arctic Region, Fisheries and Oceans, 501 University Crescent, Winnipeg, R3T 2N6 (phone: 204-985-2505)** in relation to the application of federal laws relating to the *Fisheries Act (Canada)*, and the **Navigation Protection Program, Canadian Coast Guard, 201 North Front Street, Suite 703, Sarnia, Ontario, N7T 8B1 (phone: 519-383-1862)** relating to the *Navigable Waters Protection Act*.

3. In order to reduce the potential of the spread of **whirling disease** in fish, we ask that all equipment and machinery that has been used in the United States be washed clean of all mud and dirt before being used again in any activities in or near streams in Alberta.

4. In any condition where information is to be requested by or submitted to the Controller of Water Resources, the information will be requested by or provided to the Manager, Regional Support, Northern East Slopes Region.

.../2

5. This interim licence may be amended to incorporate any additional structures that may be required within the approved fenceline for the project.

If you have further questions or comments regarding this interim licence, please contact José Michel at 427-6451 or Rick Nutbrown at 427-7049, Edmonton.

Sincerely,

Al Lang, P. Eng.
Manager, Regional Support
Northern East Slopes Region

JRM/

Enclosure

cc: Jim Skrenek, NRS-Northern East Slopes Region
Garry Linsey, Department of Fisheries and Oceans
Dennis Bratton, C & R Review Committee
Dave Henderson, EUB

CHEVIOT MINE PLANT SITE FACILITIES

Cardinal River Coal Ltd.
Bag Service 2570
Hinton, Alberta
T7V 1V5
(the "Licensee")

File No. 60335

Priority No. 1997-12-18-05
1997-12-18-06

having complied with the applicable provisions of the Water Resources Act and the Regulations is authorized as soon as right-of-way is obtained:

A. To construct works as shown on plans and reports filed, approved and identified in departmental records as:

See attached list of plans and reports

B. To divert and use water as specified and described subject to the following terms and conditions:

PURPOSE: Diversion (drainage and flood control)

SOURCE OF SUPPLY: All water sources identified in Figure 5 of "Pre-Development License Application for Earthwork and Construction Activities Cheviot Mine Facilities", December 1997 (W.R. Report No. 60335-R1), including groundwater (except direct diversion from the McLeod River)

POINT OF DIVERSION: All points where water is diverted (both consumptive and non-consumptive) within Sections 32 and 33, Township 45, Range 23, and Sections 3, 4 and 5, Township 46, Range 23, West of the 5th Meridian.

GROSS DIVERSION: Up to 3,876 acre-feet (4.781 x 10^6 m^3) annually consisting of:

1. Estimated Consumptive Use: Nil
2. Estimated Losses: 1.0 acre-foot (1 234 m^3)
3. Estimated Return Flow: 3,875 acre-feet (4.78 million cubic metres) to Thornton Creek at SE 32-45-23-5

RATE OF DIVERSION: 5.35 cubic feet per second (0.15 cubic metres per second)

Construction must be complete by 2003 –12 -31

1998
Dated at Edmonton

Manager, Regional Support
Northern East Slopes Region

EXCERPTS FROM THE WATER RESOURCES ACT

Granting of interim licence

18. (1) On receipt of the application and plans, properly approved, together with proof

(a) that the proper notice of the filing of the application and plans has been given, and

(b) that, if such is the case, the permission referred to in section 19(3)(b), has been granted and of considering all protests filed, the Minister may grant an interim licence authorizing the construction the proposed works with any changes and variations and subject to any conditions the Minis considers necessary, and fixing a term within which the construction of the works is to be completed

(2) The term of an interim licence shall be one year from its date unless a longer or shor term is prescribed in the interim licence but the Minister may from time to time extend the term

(a) for a period not exceeding one further year, and

(b) if he is satisfied that the completion of the works has been retarded by physical conditions ov which the holder of the interim licence has no control, for any additional period or periods th he thinks fit.

RSA 1980 CW
s18; 1981 c40s

Issue of permit or licence

24. (1) A permit, exploration permit, interim licence or licence may be issued by the Minister, th Controller of Water Resources or any other person authorized by the Minister in writing to do so.

(2) An extension of the term of a permit, exploration permit, interim licence or licence may be granted by the Minister, the Controller of Water Resources or any other person authorized by the Minister in writing to do so.

RSA 1980 CW-
s24

Failure to complete works within time limited

53. (1) If authorized works are not completed on the expiration of the time limited under this Act or under an extension granted by the Minister for their completion, the rights granted to the licensee cease, except in so far as they are necessary for effectually operating the works then completed.

(2) Any works constructed or acquired at the date of the forfeiture may be taken over and operated or disposed of by the Minister in the manner and on the terms here in before provided.

RSA 1980 CW-5
s53

CONDITIONS TO INTERIM LICENCE No. 22085

Definitions

(a) "Act" means the *Water Resources Act*, R.S.A., 1980, C.W-5 as amended, and any regulations under the Act.

(b) "Controller" means the Controller of Water Resources unless otherwise specified.

(c) "fenceline" means the boundaries of the area described in the Miscellaneous Lease (MLL) No. 980004 issued to the Licensee under the *Public Lands Act*, and as identified on Figure 5 of "Pre-Development License Application for Earthwork and Construction Activities Cheviot Mine Facilities", December 1997 (W.R. Report No. 60335-R1).

(d) "wells" means production wells and dewatering wells.

Part 1 Scope of Licence

1.01 This interim licence authorizes all activities related to the *Water Resources Act* for the primary purpose of dewatering that will allow the Licensee to carry on the activities granted under the *Environmental Protection and Enhancement Act* (EPEA) approval issued in response to Application No. 001-46972. The activities authorized under the *Water Resources Act* include the diversion, control and use of water, and construction, operation and maintenance of related structures within the fenceline.

1.02 Subject to condition 5.01, the construction and development of drainage, flow control, water diversion and conveyance systems may include:

(a) Intake and Conveyance Systems: intake works, channels, pipelines, culverts, flumes, siphons, aqueducts, turnouts, drop structures, crossings, dykes;
(b) Containment Structures: dams, retention ponds, sedimentation ponds, tailings ponds, dykes, lagoons, transfer sumps; and,
(c) Land Grading and Drainage Systems: berms, terraces, ditches, pipelines, culverts, flumes, siphons, aqueducts, drop structures, road crossings, stream re-alignment and outfall structures.

1.03 The Licensee may develop wells for groundwater exploration and groundwater diversion for the purpose specified under this interim licence.

.../2

Part 2 General Conditions

2.01 This interim licence and the attached conditions are based on knowledge available to the Controller at the time of issue, and therefore, the rights and privileges granted are subject to annual review and modification. Without limiting the meaning of the foregoing, the Controller reserves the right to require modifications to the works as deemed necessary.

2.02 All water released from the sedimentation ponds shall comply with the limits established under the EPEA approval issued in response to Application No. 001-46972.

2.03 The Licensee shall assume all liability for all damages caused by, or directly attributable to any error, omission or negligence in the operation of the works authorized by this interim licence by the Licensee, its officers, employees, agents or contractors.

2.04 All detailed engineering plans and analysis reports for any of the systems identified in condition 1.02 must be submitted to the Controller at least sixty (60) days prior to the start of the construction.

Part 3 Conditions Relating to Construction

3.01 The Licensee shall not dispose of any deleterious material on the ice or in the water of the sources of supply.

3.02 Subject to condition 3.03, the Licensee shall only conduct in-stream activities in the McLeod River and tributaries from July 16 to August 31 of any year in order to protect spawning and incubation of fish.

.../3

CONDITIONS TO INTERIM LICENCE No. 22085 (continued)

3.03 In-stream work between January 1 and July 15 or between September 1 and December 31 of each year will be accommodated provided that:

(a) isolation techniques are used;
(b) the Canadian Water Quality Guidelines for suspended solids are met; specifically, that suspended solids derived from construction activities shall not exceed 10 mg/L when background levels are ≤ 100 mg/L, or 10% of background levels when background levels are > 100 mg/L;
(c) monitoring of suspended solids occurs above and below the construction site during and immediately following any in-stream activity;
(d) construction activities are temporarily suspended if the levels in condition 3(b) are exceeded. Prior to resuming construction, additional mitigation measures shall be implemented to reduce the levels of suspended sediments introduced into the watercourse; and,
(e) the Licensee submits a monthly report to the Controller, indicating the occasions when exceedance occurred, the measured total suspended solids values, and the mitigation measures implemented.

3.04 The Licensee shall:

(a) take precautions to prevent soil erosion and siltation in the streams;
(b) carry out debris disposal, clean up, and reclamation concurrently with the operations; and
(c) stabilize and reclaim all disturbed areas following completion of the works.

3.05 Culverts shall be designed, installed, and maintained as described in "Pre-Development License Application for Earthwork and Construction Activities Cheviot Mine Facilities", December 1997 (W.R. Report No. 60335-R1). The Licensee shall install the culverts at the same general slope as the existing stream channel bed.

3.06 The Licensee shall use temporary crossing structures or existing road crossings during construction, for vehicle and equipment crossing of any watercourse.

3.07 All works authorized shall be constructed under the direct supervision of a qualified professional engineer registered in the province of Alberta.

3.08 The Licensee shall submit to the Controller an as-constructed report, complete with plans of the works, upon completion of the plant site water management facilities.

CONDITIONS TO INTERIM LICENCE No. 22085 (continued)

Part 4 Conditions Relating to Operation and Maintenance

4.01 The Licensee shall provide facilities for the release of water to prior licensees and other water users when requested by the Controller.

4.02 The Licensee shall cease or reduce water diversion, or release water when requested in writing by the Controller.

4.03 The Licensee is responsible for the time and manner in which water is released and for damages that may occur.

4.04 The Licensee shall submit an annual report to the Controller, on or before March 31 in each year for the preceding calendar year, indicating:

(a) periods and rates of diversion;
(b) the total monthly quantity of water diverted;
(c) the total annual quantity of water diverted;
(d) the total monthly quantity of water released to the McLeod River System;
(e) the total annual quantity of water released to the McLeod River system;
(f) monthly readings of the number of cubic metres or gallons pumped from the wells as per condition 6.06. The dates and times at which readings are taken must be included;
(g) the total annual quantity of water pumped, expressed in cubic metres or gallons;
(h) monthly water levels in existing piezometers related to the underground workings;
(i) recommendations for the adjustments of pumping rates, the number and location of observation wells, and well monitoring procedures.
(j) the status of all water management facilities within the fenceline; any modifications made during the reporting year or planned for the following year.

and such other information as may be required from time to time.

Part 5 Conditions Relating to Dam and Canal Safety Regulation

5.01 The Licensee shall submit for review and approval of the Controller, at least sixty (60) days prior to construction, plans and supporting information on all proposed dams and canals that fall under the provisions of the Act.

CONDITIONS TO INTERIM LICENCE No. 22085 (continued)

- 5 -

Part 6 Conditions Relating to Groundwater

6.01 The Licensee shall monitor the discharge of groundwater in accordance with the EPEA approval issued in response to Application No. 001-46972.

6.02 The Licensee shall, on and after the effective date of this interim licence at its own expense, investigate all written complaints relating to surface or groundwater within 3.2 kilometres of the Licensee's works in connection with the project described in this interim licence.

6.03 The Licensee shall submit a report giving the results of any investigation to the Controller within 15 working days of receiving the complaint.

6.04 When the Controller is satisfied that any water source has been unreasonably interfered with by the project, the Licensee shall notify the Controller in writing that satisfactory alternative water supplies have been arranged with the water user(s), or that a satisfactory agreement has been entered into with the water user(s).

6.05 If the Licensee fails to satisfy the Controller with respect to the matters prescribed in condition 6.03 and 6.04, on or before a date prescribed by the Controller, this interim licence may be cancelled.

6.06 Any wells shall be equipped with a cumulative meter that registers the number of cubic metres or gallons of water pumped.

6.07 When requested by the Controller, the Licensee shall install an observation well or wells, completed in the same aquifer as the production well(s), to provide data for the evaluation of the effect of this withdrawal on the aquifer and the effect on other groundwater users.

6.08 When requested by the Controller, the Licensee shall obtain water samples for purposes of chemical analyses from the production well(s). The analyses must include: total dissolved solids, pH, Ca, Mg, Na + K, H_2S, CO_3, HCO_3, SO_4, Cl, Fe and NO_3.

CHEVIOT MINE PLANT SITE FACILITIES

File: 60335

CONDITIONS TO INTERIM LICENCE No. 22085 (continued)

- 6 -

6.09 The Controller reserves the right to revise or to modify the following portions of the interim licence and attached conditions:

(a) pumping rates;
(b) number, type, location, and frequency and method of measurement of observation wells required;
(c) responsibility for investigation of complaints; and,
(d) conditions pertaining to annual water use returns;

any time that the Controller has information indicating unreasonable interference with water supplies which cannot be satisfactorily remedied or that damage of the aquifer(s) is occurring.

1998 - 09 - 29
Dated at Edmonton

Manager, Regional Support
Northern East Slopes Region

CHEVIOT MINE PLANT SITE FACILITIES

File: 60335

LIST OF REPORTS – INTERIM LICENCE No. 22085

W.R. REPORT No.	TITLE
60335-R1	"Pre-Development License Application for Earthwork and Construction Activities – Cheviot Mine Facilities" by Cardinal River Coals Ltd., December 1997.
60335-R2	"Pre-Development License Application for Earthwork and Construction Activities – Cheviot Mine Facilities – Supplementary Information Report" by Cardinal River Coals Ltd., April 1998.
60335-R3	"Aquifer Test Program: Cheviot Underground Workings" by Piteau Engineering Ltd., June 1998.

1998-09-29
Dated at Edmonton

Manager, Regional Support
Northern East Slopes Region